

The Commonwealth of Massachusetts

ANNUAL REPORT

OF THE

Division of Fisheries and Game

FOR THE

YEAR ENDING NOVEMBER 30, 1927

Mass. DEPARTMENT OF CONSERVATION: *Division of*
Fisheries and Game



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The Commonwealth of Massachusetts

The Director of Fisheries and Game herewith presents the sixty-second annual report.

GENERAL CONSIDERATIONS

The education of the public to a proper appreciation of our wild life resources and the intelligent use of them, has long been recognized by conservationists throughout the country to be the greatest single need of this generation. A handful of our youth is now being reached by the larger organizations, particularly the National Association of Audubon Societies, and in scattered schools here and there some teachers manage to work in a little bird study in addition to the regular courses. This country has a representative group of magazines, which, from time to time, discuss some phases of the work, while the press is generous in publishing items of special interest. Here and there a State may issue a bird book or an educational pamphlet or two, and the Federal government is greatly enlarging its series of instructive bulletins. But there is no concerted movement to start with the abc's of conservation of all our natural resources, to be followed by a systematic presentation to our growing youngsters and on through to the grown-ups who now express our national thought.

As a result of this lack of systematic education, beginning with the elementary things and working into the more intricate phases of adjustment and demonstration, widely divergent opinions dominate different classes of our people. The nature-lovers who do not hunt or fish, consciously or unconsciously charge the diminution of our wild life to the hunter and the fisherman. Others believe that wild life can be restored by the simple expedient of setting aside territory upon which no hunting or fishing is to be permitted, and letting it go at that. The average person has no con-

ception of the difficulties of wild life adjustment to all the changing influences set up by what we term civilization. The angler and the hunter are prone to regard with distrust the lovers of the Big Outdoors who do not hunt or fish, and look on them as persons who would prohibit all hunting and fishing if the decision were left to them. But most deplorable is the bald fact that our children are growing up, year after year, without any careful and consistent instruction to enable them to make a proper adjustment to our wild life stock. When this latter state of affairs is called to the attention of the average educator, his reaction is that our curriculums today are already so crowded that there is no place for proper instruction along these lines. Some natural history and some elementary instruction in the sciences may appear in our courses in biology, which can only be enjoyed by a few.

The remedy does not appear to be immediately at hand. The ideal plan would be to start the education of our youth along with the three r's, to be followed through into simple courses in biology in our high schools, and more elaborate instruction in our colleges. There is a real need today for more men of scientific training who will devote their time to research work. Our magazines should more systematically present the question to our people through short and attractively written discussions of one phase after another. Our press should be supplied with informing material, popularly written to pass as news. But in each State, where is the guiding hand to come from to cause all these agencies to work harmoniously? The head of the conservation work in the several States is more or less helpless. Through his annual report he can reach a scattered few. Through the issuance of a limited number of bulletins he can somewhat enlarge the circle. By sending out releases to the newspapers he can include others. But in the aggregate the percentage of the people reached is very small, and the information more or less disconnected and distinctly piecemeal.

The most hopeful sign lies in the fact that increasing numbers of teachers in our common schools are willing to make the effort to arouse interest in our wild life on the part of their students, even though this requires extra work and time on their part. Motion pictures in the homes, the instructive reels exhibited in our motion picture theatres, and the far-reaching radio, are splendid contributors; but the fact remains that our national instruction in wild life conservation is proceeding very slowly, without sequence, and with practically no systematic direction.

To be able to see the wonders of our wild life stock with a knowing eye is a priceless possession. It removes all barriers and places us on an equality. The wood thrush will sing just as sweetly for the pauper as for the king; a great tree will cast its shade on the strong and on the weak without discrimination; the butterfly will come to the humble door as well as to the palace; and the opportunities to go a-hunting and a-fishing are open to us all. Proper adjustment of this wild life stock and a businesslike administration of it, will not only fix the present supply but greatly increase it.

PERSONNEL

There were no changes in executive personnel.

In the office personnel we have to record that W. Raymond Collins, Head Clerk of the Division, and best known throughout the State for his work in the handling of the license system, died on October 19 while on duty in the office. He served faithfully in this Division for twenty-three years, and in many capacities. Much of the system of license, fish hatchery and game farm records and accounting methods were developed by him. His friendly personality, loyalty and enthusiasm for the work made him an ideal public servant.

FINANCES

<i>Maintenance</i>	Appropriations	Expenditures	Balances
Salary of the Director	\$4,000	\$4,000.00	—
Services, Office Assistants	10,620	9,936.77	\$683.23
Office Expenses	7,500	7,438.08	61.92
Education and Publicity	1,000	995.55	4.45
Enforcement of Laws:			
Personal Services	62,800	62,193.83	606.17
Expenses	30,000	29,955.68	44.32
Biologists:			
Personal Services	4,710	4,590.00	120.00
Expenses	2,400	2,358.96	41.04
Propagation of Game Birds,	89,000 }		
Animals and Food Fish	2,000 }	90,568.53	431.47
Damages by wild Deer and Moose	9,000	8,999.41	.59
Protection of Wild Life	3,400	3,324.76	75.24
Marine Fisheries:			
Personal Services	9,375	9,112.26	262.74
Expenses	2,600	2,582.00	18.00
Enforcement of Shellfish Laws:			
Personal Services	6,750	6,750.00	—
Expenses	3,600 }		
	1,000 }	4,517.66	82.34
<i>Special Appropriations</i>			
Investigations relative to Shellfish	1,000	939.29	60.71
Improvements and Additions at the Fish Hatcheries and Game Farms	8,000	7,489.38	510.62*
	<u>\$258,755</u>	<u>\$255,752.16</u>	<u>\$3,002.84</u>
This balance is available for use in 1928			510.62*
Amount actually returned to Treasury			\$2,492.22**
Balance available from 1926 ap- propriation for Improve- ments and Additions at Fish Hatcheries and Game Farms, expended in 1927	\$1,701.52	\$1,696.30	\$5.22

** It will be noted that the principal portion of this balance returned to the treasury is made up of appropriations for salary increases which remained after the salary increases for the force were announced in November.

REVENUE

The revenue turned into the State Treasury for the period of the fiscal year was:—for sporting and trapping license fees, \$242,432.50 (see detail below); lobster license fees, \$1,066.75; rent at Palmer Fish Hatchery, \$180; sale of game tags, \$39.20; permits to take shiners and suckers, \$380; lease of clam flats, \$65; lease of Chilmark Pond, \$75; sale of wagon, \$10; sale of fox skin, \$10; sale of bird book, \$5; sale of forfeited muskrat skins, \$22.50; sale of forfeited deer, \$173.10; fines turned into the State Treasury from county treasuries as a result of fish and game law violations, \$10,244; total, \$254,703.05.

Detail of License Receipts

	Total Num- ber Issued	Gross Value	Fees to Clerks	Net Return to State
Resident Sporting .	108,746	\$244,678.50	\$27,186.50	\$217,492.00
Resident Trapping	2,555	5,748.75	638.75	5,110.00
Non-resident Sporting (\$5.25) .	1,656	9,954.00	414.00	9,540.00
Non-resident Trapping (\$5.25) .	47	246.75	11.75	235.00
Non-resident Sporting (\$2.25) .	564	1,650.00	141.00	1,509.00
Non-resident Trapping (\$2.25) .	7	15.75	1.75	14.00
Alien Sporting	401	6,115.25	100.25	6,015.00
Alien Trapping	3	45.75	.75	45.00
Minor Trapping	3,583	2,687.25	895.75	1,791.50
Duplicate licenses	1,426	713.00	—	713.00
Lobster licenses	1,255	1,255.00	188.25	1,066.75
	120,243	\$273,110.00	\$29,578.75	\$243,531.25
Deduct on account of pre- vious overpayments .		37.25	5.25	32.00
	120,243	\$273,072.75	\$29,573.50	\$243,499.25

The fact that the revenues from the sporting licenses and fines in the year 1926 exceeded the total appropriations for all of the work of the Division during that year, put us in a position to discuss the financing of the Division from an entirely new angle when discussing the estimates for 1927. That the subject may be more fully understood we point out something of the historical background from the following statement to the public:—

“ANALYSIS OF THE APPROPRIATION FOR THE DIVISION OF
FISHERIES AND GAME, FOR THE YEAR 1927, IN
COMPARISON TO THE REVENUES FROM
SPORTING LICENSES AND FINES
FOR THE YEAR 1926

“For many years the appropriation to finance the work of the Division of Fisheries and Game was made in about eight subdivisions. For example, Clerical Services, Office Expenses, Director's Salary, Exhibitions and Publicity, Law-enforcement, Biological Work, Propagation of Game Birds, Fish, etc., and New Construction. When the division for the inspection of salt water fish was established, a further sub-division was added called Marine Fisheries, but it included only appropriations for the Inspector of Fish and his deputies. During those years we carried on various activities, such as the inspection of lobster shipments, the building of fishways, protection of smelt grounds, etc., which were included in the Propagation of Game Birds, etc., sub-division, but should have been included under a Marine Fisheries sub-division, but this was never done by the Budget Commissioner. As a result, we went ahead, year after year, using some of the time of the Director and of the central office force (involving some office expenditures), the biological department and the inland warden force, and drawing on the Propagation fund to cover these activities.

“But in those days the appropriations were nearly double the annual

revenues from licenses and fines, and therefore it was reasonable to suppose that a portion of the appropriation was to be used for these things which were not of direct benefit to those paying in the revenues. From 1922 to 1925 the appropriations were only slightly in excess of the revenues, but during that period we continued to carry on the work in the manner described. In 1926 (when the new sporting license went into effect) the situation was immediately changed, for in that year (for the first time in the State's history) the total revenues from licenses and fines exceeded the entire appropriation for all the work of the Division.

"This result called for a revision of our former practices, and we pointed out to the Budget Commissioner that our appropriation should be reclassified into three separate parts.

"Annually each department must submit to the Budget Commissioner, on or before October 15, estimates of sums which will be required to operate the department in the next fiscal year. Between October 15 and the following second Tuesday in January (when the Legislature annually convenes) the Budget Commissioner, from these estimates, compiles the State Budget. He lays it before the Governor. The Governor makes such changes as to him appear advisable, and he, in turn, presents it to the Legislature. The Legislature refers it to a Joint Ways and Means Committee, and this committee, after hearing heads of departments and others interested, makes such changes as it deems necessary and returns the budget to the Legislature, which enacts it; and when signed by the Governor it becomes the law under which most of the State expenditures are made. This is the procedure in financing the work of the several State departments.

"Therefore, when we came to make up our estimates (in the late summer of 1926) of the cost of operating this Division in 1927, we were certain that the revenues in 1926 would exceed the total appropriation for that year. We saw the time had finally come when we should advocate—that annually a sum be appropriated to do the things of direct benefit to the anglers and hunters who were paying in the revenues—equal to such revenues during the preceding year.

"To bring the facts out clearly we submitted to the Budget Commissioner estimates to cover our work for 1927, divided into three parts.

"Part I included estimates to do the things of direct benefit to the fresh-water angler and hunter. It was most difficult to apportion such items as the salary of the Director, office assistants, etc., and therefore all these things were included in this part.

"Part II contained estimates to cover our work for the non-game birds which is of no direct interest to the angler and hunter as compared to at least a million and a half of our people who do not hunt or fish. In this part we included the cost of maintaining the heath hen reservation on Marthas Vineyard, the wild life sanctuary on Penikese Island, and other items for maintaining wild life sanctuaries, etc.

"In Part III we included all of the work for the marine fisheries, such as the inspection of commercial salt water fish, the maintenance of our coastal warden service of five men (one of whose principal duties is to exclude the public from contaminated clam flats), the lobster work, the construction of fishways and everything having to do with the coastal fisheries. After our estimates were filed we impressed on the Budget Commissioner the fairness of having appropriated, to cover Part I, a sum at least equal to the amount paid in by the fresh-water anglers and hunters in 1926. We also urged that whatever work the Division was authorized to do under Parts II and III should be financed out of funds raised by general taxation, and that under no circumstances should the revenues from the sporting licenses and fines be used as a basis for making appropriations to finance the work grouped in Parts II and III.

"In making up the budget for 1927 the Budget Commissioner followed substantially the three parts of our estimates, but did not make sufficient

appropriations for Parts II and III to finance some of the work which we had carried on for many years, and which we had included in Parts II and III as above set forth.

"The total appropriation for this Division for 1927 was \$259,005. In the following table we show how much of the above total was apportioned, in the budget, to finance the work of each part.

Items in Budget	Part I Fresh-water Angler and Hunter	Part II Non- game Birds, etc.	Part III Marine Fish- eries
Salary of Director	\$4,000	(Item	
Office Assistants	10,620	269 in	
Office Expenses	7,500	budget)	
Publicity	1,000		
Inland Law-enforcement: Salaries	62,800		
Expenses	30,000		
Biological Work: Salaries	4,710		
Expenses	2,400		
Propagation of Fish and Birds	91,000*		
Damages by deer and moose	9,000		
New construction	8,000		
Protection of Wild Life		3,400	
Marine Fisheries:—			
Inspection of commercial salt-water fish:			
Salaries			9,375
Expenses			2,600
Coastal Wardens (to prevent taking of clams from polluted areas):			
Salaries			6,750
Expenses			4,600
Expenses, investigating shellfisheries (C. 33, Res. 1927)			1,000
Bounty on seals			250
TOTALS	\$231,030	3,400	24,575

* The item of \$91,000 covers the cost of operating the fish hatcheries, game farms, purchase of white hares, collection of white perch, distributing fish (a big item) and game birds, purchase of new stock to change blood lines, and all the miscellaneous items that have to do with the propagation and distribution of fresh-water fish and game, including purchase of trucks to handle the work. Also repairs and replacements at the fish hatcheries and game farms.

"The item of \$9,000 for deer damages has never before been a direct charge against the funds paid in by the anglers and hunters. It has always been paid out of the general funds. The total appropriation of \$231,030 covering the items in Part I, could not all be used for such purposes, due to the following reasons—

"In Part II, 'Non-game Birds, etc.' we had included, in our estimates, among other things, the cost of operating the heath hen reservation on Marthas Vineyard and the sanctuary on Penikese Island. But in the budget it was specified that \$400 of the total of \$3,400 should be used to remove the building from the Henry Cabot Lodge Bird Sanctuary on Egg Rock. The total cost of this job was \$350, leaving a balance of \$3,050 to finance not only the two stations above referred to, but also various other items which we had grouped in this part. The cost of operating the reservation and sanctuary was, roughly, \$5,100. This work could not be abandoned. Therefore we had to use \$1,336 from the Propagation item, \$665 from Biological Work: Expenses, and \$50 from New Construction—all in Part I.

"In Part III, 'Marine Fisheries' we had included estimates to cover the

cost of inspecting all shipments of live lobsters received by our wholesale commission men from Nova Scotia, in order to collect all shorts for planting in our own coastal waters. We received no appropriation for this work. We did not feel that it could be abandoned (although we cut down the volume of it). Therefore we drew again on the 'Propagation' item of \$91,000 in Part I, for \$234 to cover the collection and distribution of such shorts. In the same part we had included the services of inspectors to do this work. But there was no appropriation, and therefore we were compelled to use members of our inland force. Their operating expenses, while on this job, had to be taken from the item 'Inland Law-enforcement: Expenses' in Part I, to the extent of \$218.

"Likewise we had included in Part III estimates for the drawing up of plans for the installation of fishways (for the coastal marine fisheries—alewives—herring), observers of the run of fish in fishways, etc., but no appropriation was made. Here again we did not feel that the work could be entirely stopped, and therefore drew against 'Biological Work: Expenses' in Part I, to the extent of \$503 to finance it.

"To sum up, the following items, this year, had to be financed out of sums appropriated for the things included in Part I of direct benefit to the angler and hunter,—

Damages by Deer and Moose	\$9,000
Non-game Bird Activities (Propagation)	1,336
Non-game Bird Activities (Biological Work: Expenses)	665
Non-game Bird Activities (New Construction)	50
Lobster Work (Propagation)	234
Lobster Work (Inland Law-enforcement, Expenses)	218
Fishways, etc. (Biological Work, Expenses)	503
	<hr/>
	\$12,006

"This total of \$12,006 should, therefore, be deducted from the total \$231,030 which on the above statement would *appear* to be the amount appropriated to do the things of direct benefit to the fresh-water angler and hunter. *The corrected figures show that actually the total should be \$219,024.*

"In 1926 the anglers and hunters caused to be paid into the Treasurer \$236,031.20 as follows:

Licenses (after clerks had retained their fees)	\$225,757.65
Fines collected by wardens	9,890.20
Miscellaneous	383.35
	<hr/>
	\$236,031.20

"Upon comparing this total revenue of 1926 of \$236,031.20 with the total actual appropriation for 1927 of direct benefit to the anglers and hunters who paid in this money (as worked out in the foregoing paragraphs) of \$219,024, it is at once seen that the Legislature of this year has failed by \$17,007.20 to appropriate, for the benefit of the angler and hunter, a sum equal to what they paid in during 1926. Even though the anglers and hunters accept the burden of paying for the damages done by deer out of the funds annually contributed by them, and this sum is deducted from the \$17,007.20 above stated, it still shows that the anglers and hunters contributed, in 1926, \$8,007.20 more than has been appropriated for them in 1927.

"Bear in mind that in this analysis we have charged up to Part I all of the operating costs of the office, salaries and expenses, although, as a matter of fact, a substantial portion of the time of the force and such office expenditures should be charged to Parts II and III. We have made

Note.—While the above figures were compiled prior to a final accounting at the end of the fiscal year, we believe only small revisions will be necessary.

no effort to do this, owing to the great difficulty in attempting any accurate apportionment."

The facts revealed in the foregoing analysis seemed to point the way for a second presentation of the situation to the Budget Commissioner, which was done in the following letter after the estimates for the needs of the Division for the fiscal year 1928 were presented to him on October 15 of this year. This was done in a letter, copy of which follows:

"Boston, Mass., November 28, 1927

Hon. Charles P. Howard,
Commission on Administration and Finance,
State House, Boston, Mass.

Dear Commissioner:

"Please refer to our letter of November 29, 1926, giving our reasons for presenting our estimates for 1927 in three parts.

"We are following the same plan for 1928. *Part I, 'Administration of the Central Office, and the Propagation and Protection of Fresh-water Fish and Game,'* includes all the activities of direct benefit to the anglers and hunters. *Part II, 'Non-game Bird Reservations and Wild Life Sanctuaries,'* has to do with our birds and animals deserving protection but not classified as game. *Part III, 'Marine Fisheries,'* includes those activities properly coming under such head.

"We have analyzed the total appropriation for 1927 (as shown on the attached statement)* to ascertain whether a sum equal to the revenues supplied by the anglers and hunters, together with fines, during the year 1926, was appropriated for the benefit of such anglers and hunters in 1927.

"This analysis shows that, after assuming the payment of damages done by deer (which we claim should not be included as a charge against such revenues), the appropriation for 1927 to do the things of direct benefit to the anglers and hunters *was at least \$8,000 less than the total net receipts from sporting licenses and fines in 1926.* This analysis could be more closely drawn to show that the amount would exceed \$10,000 had we attempted to apportion the Director's salary, the work of the office and operating expenses of the central office and the salaries and expenses of the inland warden force, over all three Parts. But all such were charged against Part I.

"*We have not included in the budget for 1928, any item to cover payments for damages done by deer, for the following reasons—*

"The maintenance of a stock of deer is of great interest, not only to our deer hunters, but also to at least a million and a half of our people who enjoy the out-of-doors but who do not hunt. Hunters have an open season of one week and are limited to the use of a shot-gun. Claims for damage to trees and crops may be collected by land owners. They may kill deer any time during the year. Section 62 of Chapter 131, General Laws, provides,

— "any farmer or other person may, on land owned or occupied by him, or, with the consent of the owner, upon land adjacent thereto, pursue, wound or kill any deer which he has reasonable cause to believe has damaged, or is about to damage crops, fruit or ornamental trees, except grass growing on uncultivated land; and he may authorize any member of his family, or any person employed by him so to pursue, wound or kill a deer under the circumstances above specified."

"They must notify the Division of the killing, but retain the carcass. The value of such carcasses will average \$25. We believe this is a problem of adjustment between agriculture and the wild life stock, and should be considered as part of the State's annual program for the upbuilding of

* This refers to the "Analysis of the Appropriation for the Division of Fisheries and Game," etc., just preceding.

agriculture. Also these claims should be paid out of funds raised by general taxation, the same as are the other State activities on behalf of agriculture. This would result in the million and a half of our people who enjoy our deer, but do not hunt them, contributing toward their maintenance. Chapter 194, of the Acts of 1927, requires that the Director of this Division approve all claims for damages before payment by the State. We believe that such claims should be investigated by an expert on fruit trees and crops, and that this work should be transferred to the Department of Agriculture or the Massachusetts Agricultural College. At present these investigations take up a substantial amount of time by the Director, the Chief Warden, and the inland warden force, all of which cost is paid by the fresh-water angler and hunter as well as the claims.

"An uncompleted survey shows that there are at least 180,000 acres of lands within the State upon which hunting is prohibited. This does not include all the watershed of the Metropolitan District Commission, or a large number of municipal water supplies, or the one hundred and sixty square miles on which hunting will be prohibited around the Swift River development. For the past three years hunting deer has been prohibited in Essex County. The deer breed in this great area, overflow into agricultural lands, and do damage. Such claims should not be charged against a group of our people who receive no benefit from the existence of such deer.

"At this point we renew our representations of the past several years—that annually there should be appropriated for the work of this Division of direct benefit to the anglers and hunters, a sum at least equal to the total net cash income from sporting licenses and fines of the preceding year. The total income from such licenses in 1927 was \$242,021.50, and from fines (estimated), \$10,400, making the total net income from these two sources for 1927 approximately \$252,421.50. There should be added at least \$8,000 which was not appropriated for this year on the basis of the 1926 revenues. *In other words, there should be appropriated for 1928, to cover the requirements of Part I of our estimates, \$260,421.50, together with an additional sum hereinafter mentioned.*

"Attached hereto is a chart showing the relation between appropriations and revenues of the Division for the ten years 1916-1926. It is interesting to note that in the years 1916-1921, inclusive, the appropriations for the Division were substantially twice the amount of the revenues. Beginning with 1922 the relation between appropriations and revenues remained fixed, with appropriations only slightly in excess of the revenues. In 1926 the revenues from the new sporting licenses and fines exceeded the entire appropriation for all the work of the Division. The appropriations in the chart included all the costs of operating the entire Division and not simply the cost of doing things of direct benefit to those who paid in the money.

"While we believe in the theory that the several divisions of the State government should be as nearly self-supporting as practicable, we feel that care should be exercised to make certain that no injustice is done in the application of it.

"While this Division functions in the interests of all the people of the Commonwealth, only a very small group of our citizens today are contributing toward its maintenance.

"Part I of our estimates includes all the things of direct interest to the group which pays. The work in the other two parts ("Non-game Bird Reservations and Wild Life Sanctuaries" and "Marine Fisheries") are of no more interest to this small group than to the rest of our people. Therefore it is not logical or just that the revenues supplied by this group should be used (or considered as the basis) to finance the work of the other two parts.

"Our anglers and hunters make up a representative cross-section of our tax-payers. After they have paid their proportionate part of the general

taxes, they make a further contribution to the State in the purchase of a sporting license to finance an activity in which they are particularly interested. These funds maintain a warden force which collects additional revenue in fines. It seems only reasonable and fair that annually they should have appropriated for services of direct benefit to them, a sum at least equal to these special revenues which they provided in the preceding year. Furthermore, they should be encouraged to keep this up and to enlarge their special contributions to meet growing demands, by the State setting aside a small portion of the general taxes they annually pay in to be added to the above special revenues to finance this work in which they are specially interested. Last year we suggested a sum equal to ten percent of the total revenues from licenses and fines of the year before. This is an arbitrary amount, not large, but at least sufficient to show that the Commonwealth is ready to help a group of its citizens which is willing to contribute generously for special purposes. *Such an addition of ten percent would make a final total of \$285,663.65 to be appropriated in 1928 to cover the cost of those things included in Part I, 'Administration of Central Office, and the Propagation and Protection of Fresh-water Fish and Game.'*

"The cost of carrying on the work included in Part II, 'Non-game Bird Reservations and Wild Life Sanctuaries' and Part III, 'Marine Fisheries' should be financed out of funds raised by general taxation. This for the reason that they are of direct benefit to either a large portion or the whole of our population. In these parts we included in the estimates for 1927, certain activities which have been a routine part of the work for many years. In Item 269 of this year's budget the sum of \$3,400 was a slight recognition of our new Part II, but this sum was obviously insufficient to carry on our routine work of long standing which we had included in it (i. e. Martha's Vineyard Heath Hen Reservation and Penikese Island Reservation), to say nothing of the other items. The same is true of certain activities included in Part III. Take the lobster work, for example. We were compelled to use some of the appropriations which should have gone entirely to finance Part I of our estimates, in order that we would not abandon these old activities entirely—although we did cut down the volume.

"In making up the budget of this Division for 1928, we earnestly urge that you fit your allocations to these three parts of our estimates as presented. In this way we will be able to ascertain whether or not we are to continue such activities. For example—we have included the operation of the Heath Hen Reservation and Penikese Island under Part II. If we do not receive an appropriation covering Part II at least sufficient to operate both of these stations, we will assume we are expected to restrict this work. Again,—in Part III, 'Marine Fisheries,' we have included estimates to cover all of our work for the lobster industry. If we do not receive a definite appropriation for this purpose we will assume that nothing is to be done in 1928 on behalf of the lobster industry.

"We specifically call your attention to the request for ten additional men in the coastal warden service in Part III. In our estimates we have defined the needs of a coastal warden service as distinct from an inland warden service. We are asking for an enlarged coastal warden service for the enforcement of all laws having to do with the marine fisheries and the exclusion of the public from contaminated shellfish areas. The present force of five men is totally inadequate to enforce this group of laws. The exclusion of the public from contaminated shellfish areas alone can never be done with five men. Today, with this force, we cannot stop the 'boot-legging' of clams from these areas and a real menace to the health of our people exists. It is not logical to expect the inland warden force (which is today maintained by revenues from the anglers and hunters) to devote its time to such enforcement with the resulting decrease in protection to the stock of special concern to those who supply the funds to

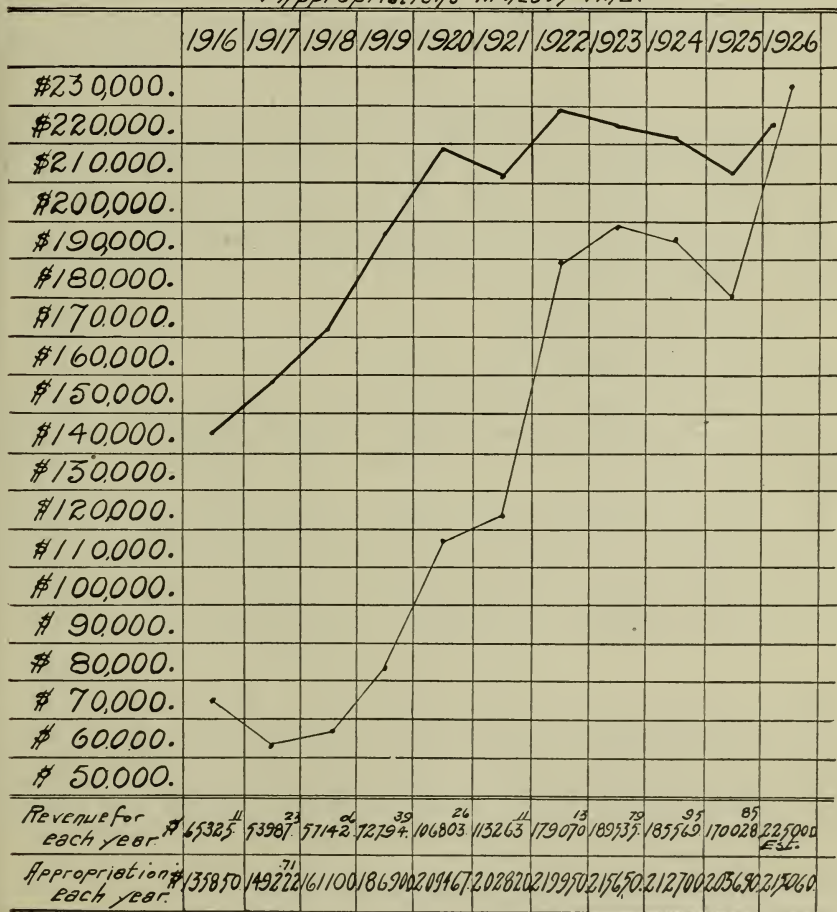
maintain the inland warden force. Therefore, if there is no provision in Part III for 1928 to enlarge the coastal warden force, we will assume that it is the intention of the government for us to do the best we can with our five coastal wardens to enforce the laws relating to the marine fisheries (used as an inclusive term to cover the mollusk fisheries as well) and the provisions of Chapter 370, Acts of 1926, and we will not expect to use our inland force for these purposes.

"If you, as Budget Commissioner, will therefore allocate the appropriations under the three Parts as defined in our estimates, all ambiguity on this point will be removed and we will be greatly aided in formulating our policies in ensuing years.

Yours very truly,

WILLIAM C. ADAMS, Director."

Appropriations and Revenues 1916 - 1926
Division of Fisheries and Game
Appropriations in heavy line.



CONFERENCES WITHIN THE STATE

The regular annual conference with the anglers and hunters and those interested generally in wild life, was held at the State House on December 29, 1926. All parts of the State were represented. The recommendations for legislation by the Division were fully discussed, and in addition, many other matters calculated to better conditions.

The Director attended numerous meetings of the local fish and game associations, bird clubs, and groups interested in wild life, as well as the lobster dealers and groups interested in the shellfish and other commercial fisheries.

ACTIVITIES OUTSIDE THE STATE

The Director attended the meetings having to do with all phases of wild life conservation, as follows:—

The annual meeting in New York City of the National Game Conference on Dec. 6-7, 1926. At these annual meetings are discussed matters relating principally to the artificial propagation of game quadrupeds and birds throughout the country.

The annual meeting Dec. 8-9 in Washington of the Advisory Board to the United States Bureau of Biological Survey, of which the Director is a member.

The annual meeting of the American Fisheries Society and of the International Association of Game, Fish and Conservation Commissioners, held in Hartford, Conn., Aug. 8-11.

The annual convention of the United States Fisheries Association, held in Boston, on Aug. 12-13.

ACKNOWLEDGMENTS

In our report for 1926 we recorded contributions (to constitute a building fund for the extension of rearing facilities at the game farms and fish hatcheries) of \$4,608.21 from the clubs, and \$10 from an individual (Dr. Fisher), totalling \$4,618.21. We recorded also the expenditure of \$4,487.23 of this sum during the fiscal years 1925 and 1926.

The balance of \$130.98 was expended during 1927 in finishing pools begun in 1926, as follows:

Montague Fish Hatchery	\$69.98
Amherst Rearing Station	61.00

This closes the building fund of 1925-6.

In the report for 1926 we recorded also the receipt of \$100 from Lieutenant-Governor Allen for the purchase of land in Sandwich, then held under lease. The details of the purchase were completed during the present fiscal year.

The result of our appeal to the local fish and game clubs in 1925 for funds was so satisfactory all round, and enabled us to make such substantial progress in enlarging the facilities at the game farms and fish hatcheries for producing more matured stock, that we took the liberty of laying before these organizations at other times, projects to be financed from funds contributed by the clubs for certain specific purposes.

Stockwell Ponds Fund

During the past year we called the attention of the clubs in Worcester County and the eastern counties to the need of a large dam across Middle Pond of the Stockwell Ponds Unit. The construction of the dam would place close to 25 acres of additional land under water, and would not only enlarge the producing capacity to this extent, but would permit of raising the height of the water in other sections of the unit. Following are the contributions to this project:—

Beaver Pond Fish and Game Club—of Bellingham	\$25.00
Blackstone Valley Fish and Game Club—of Uxbridge	25.00

P.D. 25	15
Cape Cod Fish and Game Protective Association	25.00
Clinton Fish and Game Protective Association	25.00
Dighton Fish and Game Club	50.00
Framingham Fish and Game Club	25.00
Grafton Rod and Gun Club	25.00
Hamilton Rod and Gun Club—of Southbridge	50.00
Medway Sportsman Fish and Game Protective Association	25.00
Melrose Fish and Game Club	25.00
Metropolitan Rod and Gun Club, Inc.	22.00
North Grafton Fish, Game and Bird Club	25.00
South Seekonk Gun Club	50.00
Wrentham Fish and Game Club	25.00
	<hr/>
	\$422.00

Of this sum \$405.20 was expended in a partial construction of the dam, leaving a balance of \$16.80. (See Field Propagation—Stockwell Ponds Unit).

Amherst Rearing Station Fund

At the Amherst Rearing Station we have been carrying under lease, with an option of purchase, the following tracts of land:—from Ernest M. Whitcomb and the Estate of Eugene P. Bartlett, 26 acres containing a larger water supply, suitable for trout culture, than is to be found on the grounds of the present plant; three small tracts, known as the Cowles, Bagdonis and Clark properties, respectively (purchased by Superintendent Louis Horst and leased to the Commonwealth with an option of purchase at the price paid by Mr. Horst), which are needed either to round out our holdings in order to have sufficient ground upon which to build pools to utilize the new water supply, or to protect the watershed. Mr. Horst had also purchased from the Holyoke Street Railway Company the rights previously held by said company to take gravel from lands adjoining the hatchery. It was desirable to acquire these rights for the purpose of clearing the title to one of the tracts of land on the watershed, to give us a necessary supply of sand and gravel, and to provide suitable drainage against flood conditions.

Believing that the local clubs would be interested in contributing funds to purchase these lands, the plan was submitted to the Hampden County clubs and certain clubs in Hampshire County. As a result, the following contributions were received:—

Agawam Sportsmen's Club	\$50
Hampshire County Sportsmen's Club—of Hadley	25
Holland Rod and Gun Club	25
Holyoke Fish and Game Club	50
Leeds Rod and Gun Club	25
Massachusetts Fish and Game Association—of Boston	1,000
Norwottuck Fish and Game Association—of Amherst	100
Paper City Rod and Gun Club—of Holyoke	200
Westfield Rod and Gun Club	50
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	\$1,525

The above contributions have been expended as follows:—

Purchase of the Cowles tract	\$100
Purchase of the Bagdonis tract	175
Purchase of gravel rights	200
	<hr/>
	\$475

It will be noted that the principal tract was that held by Mr. Ernest M. Whitcomb and the heirs of Eugene P. Bartlett, deceased. Messrs.

Whitcomb and Bartlett purchased this land at a cost of \$2,000 when it came on the market unexpectedly, and at a time when the Division had no appropriation with which to make the purchase. In due course it was leased to the Commonwealth with an option of purchase at \$2,000. After Mr. Bartlett's death the Division was advised, through Mr. Whitcomb, that the Estate would be willing to dispose of its interest to the Commonwealth for one-half the cost, or \$500. Mr. Whitcomb signified his willingness to deed over his interest at the same price.

The balance of \$1,050 on hand will be sufficient to purchase the Whitcomb-Bartlett tract (for \$1,000) as soon as the details of the transfer can be completed. There still remains to be purchased the Clark property (for \$350). We believe that in time sufficient contributions will be received to take over this land also.

Montague Fish Hatchery Fund

The Franklin County League of Sportsmen's Clubs has taken a particular interest in the development of the Montague Fish Hatchery. As a result of their efforts, local clubs raised funds toward advancing the construction of large pools at the lower end of the hatchery grounds, to be used in growing increased numbers of trout to year-old fish before distribution. From the contributions made by the local clubs to the League, the officers of the latter paid bills amounting to \$219.39 for blasting the stumps from several acres of land at the lower end of the Montague system. Some of the blasting was to make a new bed for the main brook so that it could be thrown to one side and the present site used for large pools. The League also made a gift to this Division of \$200 in cash from the fund they had raised. This cash contribution was received late in the year, and is being used to complete the removal of the stumps from the area mentioned, to enlarge the bed of the brook, and for preliminary excavations for additional large pools. To the close of the fiscal year \$46.02 has been spent, leaving a balance of \$153.98 on hand.

Gifts of Land

The great permanent value of wild life sanctuaries is beginning to be appreciated throughout the State by our people. This is due largely to the early activities in this field of Dr. John C. Phillips of Wenham (who in 1922 deeded to the Commonwealth the Boxford Sanctuary) and the early activities of the Federation of the Bird Clubs of New England. Later this pioneer work was carried on by the Associated Committees for Wild Life Conservation, made up of representatives of the Federation of the Bird Clubs of New England Inc., the Massachusetts Audubon Society, and the Massachusetts Fish and Game Association.

During the year the following gifts of land to be permanent wild life sanctuaries, have been received:—

From Miss Susan Minns, of Boston, 137 acres on Little Wachusett Mountain, Princeton.

From the Associated Committees for Wild Life Conservation, 39 acres on Watatic Mountain, Ashburnham; 125 acres in East Sandwich (the so-called Hoxie property). (For details, see Sanctuaries.)

Other Gifts

The Federation of the Bird Clubs of New England, Inc. contributed \$100 to assist in removing the buildings from the Isaac Sprague Bird Sanctuary (Carr Island). This was supplemented by a gift of \$50 from Mr. Isaac Sprague. All except a balance of \$1.20 has been expended. (See Sanctuaries.)

The North Shore Rod and Gun Club raised a fund of \$100 (including contributions from Ralph S. Bauer of Lynn and from the Massachusetts Fish and Game Association) to pay the cost of salvaging fish from Wen-

ham Lake for distribution in nearby waters open to fishing. Thus far \$61.58 has been expended, with a balance of \$38.42 on hand.

The Town of Falmouth paid the operating expenses of our salvage crew in trapping fish out of Long Pond (the town's water supply) for planting in open waters.

Frank C. Hatch of Fitchburg contributed \$10 for the purchase of grain for use of the district warden for winter feeding of birds.

The New Bedford Rod and Gun Club raised a fund and purchased a one-ton truck for use at the Sandwich Bird Farm.

The Federation of the Bird Clubs of New England, Inc. turned over to us a second-hand Ford touring car for use by the warden on Martha's Vineyard in law enforcement.

The Springfield Fish and Game Association and the Chicopee Rod and Gun Club were active in the collection of funds to purchase a second-hand Buick touring car for the use of the district warden.

It is impossible to enumerate in detail the countless courtesies and the very substantial assistance in our work, received from individuals and organizations, of which the Division is duly appreciative.

ENFORCEMENT OF LAW

The law-enforcement policies of the Division were carried forward vigorously during the year with satisfactory results. While the total number of cases did not exceed those of the previous year, yet the more troublesome problems were well handled. During the year it was possible to completely motorize the warden force, thus attaining an end to which we have been working for the past ten years or more. Fourteen new automobiles were purchased and this important accomplishment will undoubtedly result in a more efficient and economical enforcement of the laws in the future.

Only two changes were made in the law-enforcement personnel during the year. Warden Herbert N. Battles of Springfield was granted a leave of absence for one year as of November 30, and Carl D. Nichols of North Adams, a deputy warden for a number of years, was appointed to the regular warden force to succeed him. Miss Irene V. Lydon of the office staff resigned on September 1, and she was replaced by Miss Mary J. Carroll.

Following out the policy inaugurated a year ago, the Chief Warden spent practically his entire time directing the law-enforcement activities in the field in direct supervision of the warden force. This plan has resulted in more team work among the wardens and greater effectiveness in handling our various problems.

By legislative enactment early in the year the Division was charged with the approval of all claims for deer damage filed against the Commonwealth which previously had been paid without investigation by any State official. At the present time no claims are approved by the Division without first having been investigated by a warden, and this plan has already effected the saving of several hundreds of dollars to the Commonwealth. It has been found that in many cases the farmers make no effort to protect their crops or, as the law allows them to do, to kill the deer which come on their farms and do damage. These facts are taken into consideration and have a bearing on the amount of damage awarded. In other cases it has been found that claims have been entered for damage which in reality was caused by other animals than deer. While every effort is made to protect the interests of the farmers, unjust or unscrupulous claims are checked up wherever detected. This is an added responsibility which was placed upon the law-enforcement agency but it was well handled by the wardens during the year without any harmful effects upon the regular patrol work.

Another problem which has required the serious attention of the law-enforcement branch has been the patrol of the contaminated shellfish

areas by the coastal warden force. So serious was this situation at times that the five wardens appointed for the enforcement of this special law were inadequate to handle the job, and it has been necessary at times to employ members of the regular warden force to render assistance. Since this is a problem seriously affecting the public health it has been deemed advisable to follow this procedure to a limited degree. During the year a number of new areas were closed to the digging of shellfish by the State Department of Public Health, increasing the amount of work which had to be done by the coastal warden force, and it is very evident at this time that more men must be added to this force if the public health is to be adequately protected along these lines. The most troublesome areas are those included in Boston, Winthrop, Revere and Lynn where digging continues despite the repeated conviction of the defenders in court. In the prosecution of these cases the defendants have resorted to technicalities in the law which resulted in prolonging the final disposition of many cases in the Superior Court. When the contention of the Commonwealth is finally upheld the wardens will be able to get more prompt dispositions of their cases in court with a corresponding decrease in the number of violations. That the wardens are making considerable progress toward the exclusion of the public from the areas closed to the taking of shellfish is best indicated by the fact that 146 persons were prosecuted under this law and fines totalling \$2,225 were assessed. Although a large number of these cases are now pending on appeals which have been carried to the Supreme Court, the wardens are continuing to arrest and prosecute all persons found on these areas, and in practically every court it is realized that the public health must be protected and suitable penalties imposed.

During the year a new program was put into effect, under which the warden force immediately posted those ponds which were stocked for the first time, thus informing the public that they had come within the class of waters, to fish which a sporting license is required. After a reasonable length of time had elapsed and the public had reasonable notice of the stocking, through the newspapers and by means of the posters, the law was enforced. There is little doubt but that the increase in the amount of revenue from the sporting licenses was due somewhat to this policy, as persons who previously made an effort to evade paying their share of maintaining the sport by fishing only in unstocked waters were this year required to buy a license and thus pay a just part of the divisional expenses.

For the first time since the law was enacted in 1925 his Excellency the Governor was compelled to suspend the fishing season between April 14 and April 23, due to the serious forest fire menace. The Governor exercised his further authority by prohibiting all persons from entering the woods, regardless of their purpose, since this proved to be the only effective way of meeting the crisis, and the warden force patrolled their districts practically night and day to enforce the provisions of the proclamation. Thirty-seven persons were prosecuted for illegally fishing or for unlawfully entering the woods during this period, and many others who unintentionally violated the proclamation were warned of the seriousness of the situation.

Valuable help was rendered during the year by some of the deputy wardens. While the net results accomplished by the deputy warden force (numbering approximately 250), were relatively small, this does not detract from the energetic and earnest service rendered by some members of this branch of the service, despite the fact that they receive no compensation either for their time or expense. It merely indicates that many of the other deputies have either lost interest in the work or are so situated, by reason of regular business endeavors, that

they cannot devote time to law enforcement. To remedy this condition many will fail of reappointment at the end of the year.

The court work for the year was as follows: Number of cases, 1,057; convicted, 971; discharged, 86; (filed, 140, appealed, 47); fines imposed \$15,246; costs paid, \$80. In addition to the penalty imposed by the court, each person convicted loses any sporting or trapping license which may have been issued to him, together with his right to secure a license for one year following date of conviction. Licenses revoked: resident citizen sporting, 134; non-resident sporting, 4; resident trapping, 28; alien sporting, 3; minor trapping, 3; resident lobsterman, 2; alien lobsterman, 1; total, 175.

In the various classes of violation of the fish and game laws the most flagrant is that of fishing without first securing a sporting license. Although the greatest possible warning has been given yearly as to this requirement of the law, a large number of people neglect to purchase a license and others deliberately attempt to evade the law, thus refusing to pay their share of the expense of maintaining the conservation work. Two hundred fifty-two persons were prosecuted under this heading, and in all but 86 cases convictions were obtained and substantial fines imposed. Fines imposed in these cases always greatly exceed the cost of a sporting license, and there is, further, the loss of license. Despite these heavy penalties the law is openly ignored but the warden force is continuing to be vigilant for such violations as the above record indicates.

While a much smaller number of persons were prosecuted for hunting without a sporting license yet 91 were brought before the courts under this charge, indicating that many hunters also tried to violate this well-known provision of the law.

The dangers attendant upon the enforcement of the fish and game laws are again demonstrated by the experience of Warden Carl G. Bates of Warren on October 29. While in the woods at Palmer examining two hunters whom he was about to place under arrest (as they were found to be aliens unlawfully possessing firearms), he was attacked by Anthony Lopes of Chicopee, armed with a loaded shot gun, who warned him to release the prisoners under a threat of death. Being unable to draw his own weapon Warden Bates was forced to withdraw from the scene. However, an immediate and thorough investigation with the very efficient and willing co-operation of the Palmer and Chicopee Police Departments resulted in the apprehension of the offender, who has been held for the Grand Jury charged with an attempt against the life of Warden Bates.

NEW LEGISLATION

The following new laws pertaining to fish and game were passed during the legislative session of 1927:

Chapter 5 amended the trout law so that definite protection was given to Loch Leven trout, similar to that given to brown trout. This was necessary due to the introduction of this new species into the State.

Chapter 6 placed a close season on blue gills and sunfish from December 1 to July 1 of the following year; provided a bag limit of forty per day and a minimum length limit of six inches.

Chapter 33 of the Resolves provided for a joint investigation by the Department of Public Health and the Department of Conservation relative to the rendering of shellfish in the contaminated areas safe for food.

Chapter 54 extended for one year the close season on hares in Essex County.

Chapter 60 extended for one year the close season on deer in Essex County.

Chapter 100 pertains to the herring fishery in the town of Yarmouth and authorized the town to grant a long-term lease for the operation of this fishery.

Chapter 142 repealed the law prohibiting the taking of hunting dogs into the woods between March 1 and September 1.

Chapter 174 relative to the fisheries on the Taunton Great River amended the law relative to the maintenance of the fisheries by the towns and cities bordering on the river.

Chapter 194 amended the law relative to the payment of claims for damage caused by deer and moose so that no claim is now paid by the Commonwealth unless it has been approved by the Director of this Division.

Chapter 307 restricted to one bushel the amount of clams which may be taken for family use in the cities and towns in the county of Essex.

EDUCATION AND PUBLICITY

The main effort along this line was the staging of an exhibit at the New England Sportsmen's Show, from January 29 to February 5, in Mechanics Building, Boston, under the auspices of the Massachusetts Fish and Game Association. This exhibit included a complete set-up of the hatching and rearing of brook trout, from the eyed-out eggs in troughs of running water through all the stages of growth up to maturity. Also a representative group of pheasants was shown. In addition there was an exhibit of illegal apparatus and various devices by which the fish and game laws are violated, with further educational features in connection with law enforcement.

The work of the central office is growing so rapidly that it has been impossible to give as many public lectures and illustrated talks on the work as in previous years. This is particularly true in the case of the Chief Warden, who is now devoting practically his entire time to field work.

The exhibit at the Eastern States Exposition in Springfield was the only one given this year in connection with agricultural fairs, although stock was loaned to 2 organizations for such purposes.

Through releases to the press and special articles we continued to keep the public informed of the work in general.

BIOLOGICAL DEPARTMENT

FIELD WORK

Owing to the vigorous campaign of previous years to install fishways, very little along this line was done during the past year. Practically every one of our important coastal streams, except the Neponset and the Charles River, is now open for the run of anadromous fish.

The transplanting of alewives was continued, as well as the collection of statistics on this fishery and on the mollusk fisheries.

More than the usual amount of time was spent on the development and stocking of sanctuaries. The number of requests to visit private estates and advise on methods of increasing wild life denotes a larger public interest and an ever-widening field.

The local fish and game associations are showing greater interest in assisting in the active work of artificial propagation of both fish and game birds, with the result that more time of the biologist has been required for inspections and consultations on such matters.

The usual number of reports of fish dying in widely separated ponds, were investigated.

The biologist had direct charge of the preparation and staging of the exhibit at the Sportmen's Show, which occupied his time over an extended period.

The usual number of trips to the game farms and fish hatcheries were necessary to inspect the stock, and the losses at the Marshfield Bird Farm required special attention. Each year shows an increase in the number of specimens of fish, birds and animals sent in for examination and au-

topsy. The usual amount of photographing of the various phases of the work, was done.

DISTRIBUTION

The details of the distribution of stock produced at the game farms and fish hatcheries continue to multiply and are taking up an increasing portion of the time of the biological department. The aim of the Division is to distribute equally over the entire State, the stock annually available. This involves careful study of the amount of suitable streams in each county for trout; the amount of suitable cover for white hares, and pheasants; and the pond area of each county for pond fish. These are the considerations on which the distribution of stock is made, and not on the number of applications or the number of local fish and game clubs in a given county. This is the only method by which an equal distribution can be effected. This part of the work is described more fully under Fish and Game distribution.

WILD BIRDS AND ANIMALS

WINTER FEEDING

We were fortunate in having a comparatively open winter. Preparation for emergencies was made by the purchase of grain and allowances made to the wardens. There were several brief periods during which we received requests for the distribution of feed, but the shipments were withheld for the reason that we did not consider that the birds were *in extremis*. The grain that we had on hand and bagged ready for emergencies was later on transferred to the Ayer Game Farm.

Owing to our limited funds it is never possible to do more than to meet those grave conditions which occur every so often, when it is a matter of life and death with the birds. Unless they are beset by storms of long duration and great intensity, such species as are common to this State in the winter can adjust themselves to normal conditions. In this direction, as in practically every other, the public is taking a deeper and more sustained interest in helping meet such emergencies, and the State is now fairly well organized to respond on short notice.

BREEDING SEASON

The effect of the weather conditions on the several species will be touched on in the discussion of each. The spring breeding season started with favorable conditions, but the persistent cold, wet weather continuing through the late spring and summer made the season, as a whole, subnormal.

FIRES

The extreme drouth of the spring made it necessary to postpone the opening of the trout fishing season from April 15, the usual opening, until April 24. (See Inland Fisheries—Brook Trout). Through the remainder of the year conditions have been normal.

POSTED LAND

In the discussion of the financial set-up of the Division it was shown that on at least 181,000 acres, hunting is prohibited. This is the first time that any such survey ever has been made, and the figures, even though incomplete, are impressive. However, there is no reason to believe that the posting of land is on the increase. The land owners of the State continue to show a democratic attitude toward the hunter and the fisherman that should be increasingly reciprocated by the latter. When the time comes that the non-land-owning portion of our people will treat the land and other property upon which they are privileged to go, with the same consideration and care that they give their own, many present difficulties will be removed.

MIGRATORY BIRDS

Song and Insectivorous Birds

The policy of issuing permits for the collection of birds, eggs and nests for scientific purposes was changed this year. Heretofore such permits have been issued annually. They are now issued to be effective until revoked, though an annual report from each holder is still required. Seventy-two permits were issued. On the basis of the reports (of which 69 were received) 334 birds and 645 eggs were taken.

We have continued to give to the song, insectivorous and other desirable non-game birds, equal care and protection to that given the game birds. This we continue to regard as one of the greatest obligations of the Division.

Migratory Game Birds

Shore Birds.—Under rules and regulations of the U. S. Department of Agriculture a close season for two years has become effective on all shore birds.

Plover.—The status of the golden plover, upland plover and the piping plover remains unchanged.

Snipe.—The spring migration was normal. The fall migration offered less opportunity for sport than usual. Ordinarily much of our snipe country is dry in the fall, with the result that the birds do not stop. This year the opposite conditions obtained—there was so much water on many of the snipe grounds that the birds passed on. There was a lighter fall flight than has been noticed for several years.

Woodcock.—There was the usual number of breeding birds in the localities where they ordinarily breed. While the summer was cold and wet there was no indication that it affected these birds adversely.

The fall flight was heavier and more widely scattered than usual. From all indications there were more woodcock on the fall migration, taking the State as a whole, than in recent years.

Rails.—Owing to the absence of any open season on shore birds, more than usual attention was paid to rails, for the reason that the season opened on September 1, thus affording some gunners the opportunity to go afield before the opening of the duck season on September 16. We believe that the rail season should open at the same time as the duck season, and have so advised the Federal authorities.

Sandpipers.—These birds are distinctly on the increase, as judged from the large flocks reported during the summer migration.

Winter and Summer Yellow-legs.—There has been a noticeable increase in the spring flight of both species, but the summer and fall migration has shown little or no corresponding increase.

Curlew.—There was a slight increase, which would bring them back to the status of two years ago.

Ducks.—The wood duck is slowly on the increase, but the steady building up of the regions which are its natural summer home is gradually forcing it out of various localities.

More mallards were taken during the year than usual.

The spring flight of red heads was normal. The same applies to blue bills. On the return migration more of such ducks have been reported than last year.

The black duck continues to hold its own. We renew our statement of previous years that this bird can be very substantially increased when we are in possession of permanent sanctuaries that are particularly adapted to it.

More than the usual number of canvasbacks were noted during the fall migration.

Geese.—From December 1, 1926 to the close of the season the movement of geese was fairly light as compared to the conditions over the past five years.

The spring flight was without special incident.

The fall flight was light up to the close of this report (November 30).

Extraordinary weather conditions have prevailed during the past two or three years, that may or may not have been a factor in the migration of geese. At any rate, the flight has been light during the early part of each open season.

The spring flight of brant was of the usual proportions. Up to the latter part of November the brant had appeared in only very small numbers along the coast, with the usual concentration in Vineyard Sound in that district between Tuckernuck, Muskeget and Nantucket.

Statistics of the Gunning Stands.—Number of stands operated, 134; geese shot, 4695; ducks shot, 9584; live goose decoys used, 5777; wooden goose decoys used, 4090; live duck decoys used, 4632; wooden duck decoys used, 3415.

Migratory non-game Birds—Gulls and Terns

Owing to the splendid activities of the New England Bird Banding Association, which has a very large membership in this State, the Division has never undertaken the banding of our non-game birds.

The gulls and terns which frequent our territory appeared in usual numbers, but the cold and excessively rainy summer retarded and reduced the period of breeding, with a corresponding lowering of production. But, taken as a whole, these species are at least holding their own, and in some localities the colonies are on the increase.

Federal Control of Migratory Birds

The Game Refuge Bill continues to be the outstanding piece of conservation legislation in Congress. A small group of irreconcilable Senators, resorting to well-known dilatory tactics, delayed action on the bill until the closing hours of the Senate, when, owing to the filibuster which characterized the close of the last session, it was impossible to advance this, as well as other desirable legislation.

During the summer and fall the bill was very carefully studied, and modified in some important respects so as to remove objections. Its title was changed to read, "A Bill—to more effectively meet the Obligations of the United States under the Migratory Bird Treaty with Great Britain by lessening the Dangers threatening migratory Game Birds from Drainage and other Causes, by the Acquisition of Areas of Land and of Water to furnish in Perpetuity Reservations for the adequate Protection of such Birds; and by providing Funds for the Establishment of such Areas, through Maintenance and Improvement, and for other Purposes."

During the past year there has been considerable clearing up in the minds of our people as to the purpose of this legislation. Various groups which have desired to attain the ends proposed in this bill, but by other methods, now realize that it comes as near to providing protection to our migratory birds as any legislation which can ever be proposed. They have finally come to understand that it is hopeless to expect to maintain the birds we now have, and increase the supply, unless we preserve the producing plants (the remaining breeding grounds, with the restoration of others) and the storage facilities during the winter, for the manufactured product (ample permanent wild life sanctuaries in the wintering zone). If the measure can be brought to a vote in both branches of the Congress without being hamstrung through dilatory tactics, it is certain to become a law in the next session.

UPLAND GAME

The Hunting Season

No concern was felt over the possibility of closing the season this year, due to drought, for the reason that there was more water in our rivers,

due to the cold, wet spring, than has been the case for many years; but the weather was extremely warm throughout the entire period, so that, from the point of view of the hunter and his dogs, it was generally unsatisfactory. However, there were no storms of any great duration to cut down the number of hunting days.

Pheasant.—Owing to the unusual amount of water in many localities, much of the usual hunting country was inaccessible, and the birds worked back into such flooded country out of reach of the hunters. All in all, not so many birds were found as during the last two previous seasons. Much of this may be attributed to the conditions just mentioned, but in addition the cold, wet summer was the most unfavorable breeding season that these birds have experienced for a long time.

The total number of pheasants reported shot in open season was 2,356, divided according to counties as follows: Barnstable, 12; Berkshire, 71; Bristol, 174; Essex, 322; Franklin, 70; Hampden, 185; Hampshire, 163; Middlesex, 462; Norfolk, 201; Plymouth, 251; Suffolk, 6; Worcester, 417; locality not reported, 22.

Ruffed Grouse.—An alarming scarcity of grouse has been reported from all sections of the State. However, in a few localities here and there the birds have been reported as present in usual numbers, based on the averages of the past five years. A report was requested of all the wardens at the end of the first week of the open season, and with few exceptions the grouse were reported as being alarmingly scarce. Many hunters making their reports on pheasants shot volunteered information on the grouse, which was uniformly to the effect that the birds were very scarce, and many of these reports were accompanied by the suggestion for a close season of from one to five years.

The ten-day period between the closing of the grouse season and the close of the period of this report, has been insufficient for making a thorough survey, but the information at hand indicates that we are at that stage in the life cycle of the grouse where the birds have been reduced to the minimum. Nearly every observer has a different theory as to the cause, but in the last analysis we are simply compelled to admit that we do not know what has brought it about. Undoubtedly the wild hunting house cat and other predatory quadrupeds and birds have taken their toll; the birds have undoubtedly been excessively shot at in some localities; and the conditions during the breeding season were the most unfavorable for some years. But none of these factors seems to be the dominating one, and we are led to believe that the principal cause is the presence of disease.

The New England Ruffed Grouse Investigation Committee is continuing the work along the lines previously laid down. It is steadily adding to the volume of valuable data that is being accumulated concerning not only the diseases to which the grouse may be subject, but on such other problems as food, plumage, moults, vermin, etc. A report by Dr. A. O. Gross of Bowdoin College, Brunswick, Me. (who is in charge of the work in New England) was printed in "The National Sportsman" for June, 1927, and a paper entitled "Investigating the Ruffed Grouse" by Dr. John C. Phillips appeared in "The Sportsman" for June. A statement by the Committee was put out in September. It is planned to continue the work over several more years.

Quail.—In what might be called the best quail range (from Boston south and east to Provincetown) the quail has held its own over the past few years. Several years ago the birds increased to very satisfactory numbers, and they have held up very well to that level ever since. With the quail the problem seems to be largely that of providing many suitable feeding grounds, and protection against vermin and the winter kill. It is very seldom that in our short open season the gunners can clean out the quail in a given locality.

It is questionable whether much benefit is being derived from the con-

tinuous close season on quail in various counties. The birds do not seem to be propagating as rapidly as was originally hoped for under this plan. We are inclined to believe that the solution lies in systematic and careful restocking of these regions with adult quail in the spring, and to this end we have resumed the breeding of quail at the Sandwich Bird Farm, as is more fully noted under Propagation of Fish and Game.

It is of interest to record an instance of migration of quail from Penikese Island to Cuttyhunk Island. In May, 1925 we liberated 59 quail on Penikese. Not many days later it was reported to us that quail had been heard whistling on Cuttyhunk Island, for the first time in many years in the history of the village. Three were seen on the "Neck," which is the northernmost point of Cuttyhunk and the nearest point to Penikese, a distance of about one mile.

Deer.—There was the usual open season of one week from December 6 to 11, 1926. During this period 2,261 deer were killed, by far the largest number shot in any one year since the season was first opened in 1910. This total consisted of 1,162 bucks and 1,099 does, divided as to county, as follows: Barnstable, 305; Berkshire, 368; Bristol, 95; Franklin, 422; Hampden, 246; Hampshire, 194; Middlesex, 56; Norfolk, 27; Plymouth, 215; Worcester, 332; locality not reported, 1. These figures speak for themselves as to the status of the deer. There was considerable snow during most of the open period, but it was of a depth, accompanied by weather conditions, that was about as hard on the gunner as favorable to the deer.

The indications are that the breeding season in 1927 was favorable, and that we have today a relatively large stock of deer in our State.

Deer shot while damaging crops numbered 108. Claims for damage were paid amounting to \$8,999.41 (the extent of the appropriation), and further claims are pending which must await payment until additional appropriation has been made.

By a change in the law this year the Director is now required to approve these claims for damage done by deer and moose before the same are paid by the Treasurer of the Commonwealth. In all other respects the procedure of handling such claims is the same as during past years. Each claimant is now required to sign, under pains and penalties of perjury, and file a statement of the nature and extent of the damage claimed. The Chief Warden and the inland warden force make an investigation, having before them the appraisal of the local committee containing the final action of the County Commissioners. It is at once evident that this arrangement imposes a great deal of additional work on our warden force and the central office in handling all the details of the claims. Between the time of the enactment of the law and the close of the fiscal year, 185 claims were investigated.

While we have fully discussed, in the letter to the Budget Commissioner under Finances, the broad question of how payment of claims for damage should be financed and the agencies which should handle the entire matter, there is an additional angle to the question which requires further comment. This relates to the extent to which it can reasonably be asked, that the land owners exercise more diligence in protecting their crops and trees against damage by deer. We have already passed on a sufficient number of claims to be able to draw some general conclusions. In some instances the land upon which the crops and trees are located is posted, and the owners admit that they have made no effort to avail themselves of the wide-open provision of the law which permits them to kill, at any time of the year, either on their own land or (with permission) on the land of an adjoining owner, deer which they have reasonable grounds to believe are about to do damage. In other instances we find land owners have set out orchards in isolated places, adjoining the heavily-wooded sections which are well known to contain deer, and have given the trees the minimum amount of attention during a year. We have had

cases where damage was charged up to deer which investigation showed was done by climbing cutworms. There are also cases where the claimants have, year after year, collected for damages to crops in a given small area. By citing these cases we do not wish to cast any reflections on the land owners of our State as a class. We believe that, with a few exceptions, they are earnest and fair-minded and have no desire to take advantage. But at present we have this situation—the appropriations to pay for damage done by deer are now included in the amount which is annually appropriated for this Division to carry on that part of its work of direct benefit to the fresh-water anglers and hunters. In other words, every dollar we pay out for deer damages means just that much less which may be expended on behalf of the hunters and fishermen. The final word as to what shall be paid on a given claim rests with the Director of the Division. While he intends to be as reasonable and fair in his adjustments as is possible, at the same time, under the existing set-up, he and his successors will naturally wish to safeguard the funds, to the end that the largest possible amount will be available for the direct benefit of those who pay in the money. This appears to be a further argument in favor of transferring the duty of determining such damages to the Department of Agriculture or the Massachusetts Agricultural College, and the payment of such claims out of funds raised by general taxation, the same as other activities on behalf of agriculture are financed.

Squirrels.—The squirrel population depends directly on the amount of suitable food. The squirrel will travel until he finds it. We have begun to grow at our stations substantial numbers of black walnut trees, which we hope to see widely present over the State during the next ten years. If our people will take a greater interest in planting the hickory nut and black walnut trees it will do more to bring back our squirrels than would any other course. These animals now have a close season of eleven months, and our climatic conditions present no problems. There has been an increase generally throughout the State.

Hares and Rabbits.—The absence of cottontails from large sections of our scrub-oak-covered State presents a very interesting study. Undoubtedly it is a combination of factors. The rabbit is the food supply for much of our wild life catalogued as vermin, and there is a longer open hunting season than should exist. We can only renew our statement of previous years, that there is no form of upland game in the United States which can stand the present open season of four months now in force on the mainland.

The extent to which this can be remedied by the importation of cottontails from other parts of the United States is debatable. The large number of sub-species of this animal raises the question as to whether they will successfully inter-breed. But perhaps this is not so controlling a factor as the presence of the disease called Tularemia over large areas of the natural rabbit country west of the Mississippi River. The presence of this disease has caused us to proceed slowly in the importation of cottontails, for we believe that it would be better to adjust our own shooting season and conditions in such a way as to give our native cottontails a more business-like administration, than to try to import them and run the risk of spreading disease.

The conditions are, as usual, "spotty." Some sections where an abundance of cottontails would be expected are practically clean. There are other sections where they are quite plentiful. One solution of this question is the establishment of colonies on certain of our islands from which a limited amount of restocking can be done each year.

Fur-bearing Animals.—The amendment to the trapping license law (section 3, Chapter 352, Acts of 1926) resulted in the first systematic census of the fur catch ever taken.

The returns for the calendar year 1927 (the law requires the report to be made for that period) are as follows: muskrat, 33773; mink, 1170;

skunk, 7223; red fox, 2411; gray fox, 155; raccoon, 173; weasel, 889; otter, 35; total, 45,829. The foregoing covers the reports of 1687 trappers.

Judging from the numbers of inquiries we believe that interest in the establishment of privately operated fur farms is increasing, especially respecting the muskrat.

In addition to making the returns required by law we invited comments from the trappers. These revealed wide-spread differences of opinion among them as to open seasons and restrictions in general. There will always be the difficult problem of maintaining the balance between our fur-bearing animals and our other forms of desirable wild life, but we believe that this can be worked out to insure a valuable annual fur catch.

ENEMIES TO GAME

Cats

The toll taken by the wild hunting house cat from our wild life continues unabated. We believe it is on the increase. We can but continue to warn our people that this menace will have to be dealt with sooner or later, and the longer we postpone taking it up in a firm and businesslike manner, the longer will be delayed an appreciable increase in our wild stock. Legislation to license the cat, and the collection and humane disposition of those unlicensed, is an entirely reasonable proposition.

During the year the county treasurers paid out \$1,020 in bounties on 102 wild cats, for which they were reimbursed from the Treasury of the Commonwealth. We renew our suggestion that there should be an increase in this bounty, in order to encourage the reduction of its numbers. Also that there should be a uniform law throughout the New England states under which to approve and pay claims for these bounties.

Hawks, Owls and other Vermin

In our previous report we spoke of the invasion of the State, in the late fall and early winter of 1926, by goshawks and snowy owls. These birds continued to increase in numbers well into the winter of 1926-7. It is safe to say that it was the heaviest migration of these species that the State has seen in many years, and the stock of grouse suffered accordingly. Reports of destruction of grouse by goshawks were received from all parts of the State. While the snowy owl likewise appeared in unprecedented numbers, little tangible evidence was produced to show that they did any damage.

RESERVATIONS

Martha's Vineyard Reservation

Dr. Alfred O. Gross has continued his scientific study of the heath hen, and we have continued to rely on his recommendations. He made his annual investigation in the spring, and his report is as follows:

"The 1927 annual census of the heath hen of Martha's Vineyard island, Massachusetts, has just been completed under the auspices of the Federation of the Bird Clubs of New England Inc. It was taken under ideal conditions of weather and was done with unusual thoroughness, since I was assisted by Mr. Arthur L. Clark, former chairman of the Heath Hen Committee, Mr. Allan Keniston, superintendent of the reservation, and Mr. Edward F. McLeod, the special warden employed by the Federation. We were able to account for 13 birds and there are today probably less than 30 birds on the entire island. How much less it is impossible to state. The largest number of birds seen at any one time was ten on the farm of James Green near West Tisbury. We also noted, but never on the same day, 3 birds on the Thompson farm, 3 on the Dr. Fisher Road, 3 on the reservation and 2 on the Bowker Road. If we should include all of these numbers it would total 21 birds, but it should be emphasized that all of these places are within easy range of each other and a careful study of the records clearly indicates them to

be duplications, with the possible exception of the 3 birds seen on the Dr. Fisher Road. During the past winter all of the heath hen were concentrated on the Green Farm and there were never more than 13 birds. This spring when the birds began to appear at other places the Green flock dwindled correspondingly, making it obvious that the birds were dispersing from this one place. Birds were reported from 5 other sections of the island but we have no evidence of their existence there, other than the person who reported them. A diligent search by the wardens, and also repeated visits to the localities by those taking the census, failed to verify the reports.

"It is apparent that thus far our hopes of greatly increasing the numbers of heath hen have not been realized. To the contrary, review of records and a consideration of the conditions under which the counts were made for the past few years inclines me to believe that there has been a steady decrease since the count of 54 birds made in 1924. The numbers reported from year to year are subject to considerable error because of the difficulties involved in taking the census. For example, the estimate of 25 birds in 1925 may be a little too low and our estimate of 35 in 1926 a little too high. This year, however, the two wardens, aided by numerous citizens of the island, have made a greater effort than ever before to locate every heath hen. Furthermore, the conditions under which the present census was taken were ideal for locating a maximum number of birds. It is therefore probable that the number 13, rather than the estimate of 30, more clearly represents the number of heath hen in existence today.

"The Federation of the Bird Clubs of New England Inc. has expended nearly \$7,000 during the past year in maintaining a special warden at the island to assist the State in saving the birds. Mr. McLeod, the Federation warden, has shown great enthusiasm and has been very energetic in his work, but his efforts, through no fault of his own, have not produced tangible results. The problem of saving the heath hen is not the simple one of providing protection against hawks and cats, and of supplying food when needed, but it is very complex. A study of the heath hen problem has revealed other important factors such as the inadaptability of the species, excessive interbreeding, excess male ratio and disease, which are not readily controlled by the wardens. Disease is probably the most potent factor in the decline of the heath hen. We now have evidence that the heath hen have been infected with "blackhead," that disease dreaded by all poultrymen, especially those who have attempted to raise turkeys. The finding of this disease in adult heath hen is, according to Dr. E. E. Tyzzer of the Department of Pathology, Harvard Medical School, strong presumptive evidence that it is most destructive to the young birds. Even in turkeys, where it is most fatal, it is seldom found in adults, but entire flocks of young are quickly wiped out of existence. Unfortunately this disease is carried by poultry, and herein lies the great danger to the heath hen. The heath hen have the habit of congregation on the open fields, especially in the spring, to go through their weird and peculiar courtship antics. These fields are usually near farm houses, as is the case on the reservation, and in most instances the poultry have the freedom of the same field. I have seen poultry and heath hen feeding together, thus offering every opportunity for infection. Several birds have been found dead or in a dying condition, emphasizing the importance of disease in the present status of the heath hen.

"These facts present an entirely new angle to our problem and the Federation will do well to turn its energies in that direction. In spite of the fact that there is an apparent decrease in the number of birds the Heath Hen Committee will be continued, and I gladly offer my services whenever needed. The State Division of Fisheries and Game has expressed its determination to continue the Heath Hen Reservation as long as there

is a living heath hen. Director William C. Adams has already taken positive steps to fight the problem from the standpoint of disease. On the advice of Dr. E. E. Tyzzer, expert on game bird disease, Superintendent Keniston has been instructed by Director Adams to remove all poultry from the reservation and to sterilize the premises where poultry has been kept. Garden plots, containing a variety of vegetables relished by the heath hen, were planted last summer and are being continued this year. A large part of the forestry reservation of 5,000 acres, which surrounds the heath hen reservation, is to be closed to hunting to reduce to a minimum the disturbances caused by hunters during the rabbit season. This, if carried through as now planned, will include practically the entire area occupied by the heath hen. The fire stops are being continued and greatly extended by the Division of Forestry, which will lower the risks to the heath hen by fires. During the past year the Division has added an additional warden on Martha's Vineyard, who will now continue as an assistant to Mr. Keniston in protecting the heath hen. Under these conditions it does not seem advisable that the Federation should continue the great burden of financing Mr. McLeod, who can accomplish but little in addition to that now being well done by the State with the assistance and advice of the Federation Heath Hen Committee and all persons vitally interested in the heath hen.

Alfred O. Gross."

The Federation continued to maintain Mr. Edward McLeod to assist in the protection of the heath hen on the Vineyard up to May 1. We were notified that on and after that date his services would not be retained.

In a letter dated April 29 we were advised of the formation of a Heath Hen Committee under the auspices of the Martha's Vineyard Rod and Gun Club, and of their intention to continue the services of Mr. McLeod as of May 1.

Mr. McLeod has continued as an unpaid warden of the Division, and in addition to the predatory birds unprotected he was given special authorization to kill marsh hawks.

There was only one fire of any importance,—on April 28 and 29. It began very soon after noon, and, owing to the high wind, spread very rapidly in spite of the fact that a half-inch of rain fell during the night. It started at a point about a mile east of the reservation house and travelled in a southeasterly direction to a corner a bit northeast of Wintucket Cove and bordering the cover, following around the Cove to Naushemois Point and to the valley of Janes Cove, west to a point on the main road between Edgartown and West Tisbury, and thence northerly to the point of beginning. Some 850 acres were burned over, according to the estimate of the Forestry Division, and of this 300 acres had been burned the previous year. From observations during the fire and immediately thereafter we believe no damage was done to the heath hens. The territory burned over was not that which in recent years has been frequented by the heath hen to any extent.

Superintendent Keniston has continued to follow the policies worked out by the Division and Dr. Gross as best calculated to surround the remaining heath hen with favorable conditions under which to reestablish themselves. He has continued trapping, and from December 1, 1926 to November 30, 1927 collected the following vermin: 21 cats, 17 crows, 10 hawks and 61 rats.

The stomachs of most of the specimens collected were forwarded to Dr. Gross for examination.

Although we have received unconfirmed reports of flocks of young heath hen, there is no evidence to indicate that the remaining birds bred to any extent. In order to have a definite standard by which to judge the condition of the colony, it was decided several years ago, to rely on the annual spring census when the birds have collected on the breeding grounds

and are most easily located by the calls given during the mating period.

It is hardly necessary for the Division to state its intention to continue its efforts to bring back these birds until the last living heath hen is accounted for.

Penikese Island Sanctuary

During the winter of 1926-7 the principal effort at Penikese Island was directed toward inducing as many migratory wild fowl as possible to take advantage of the food and water supply on the island. To further this, we maintained a group of live wild goose decoys and a flock of duck decoys, and at all times kept grain easily accessible to any visitors. The daily reports of the superintendent showed an increase in both geese and ducks coming to the island. It is of interest to note that on May 10, six and on May 11 nine woodcock alighted on Penikese Island.

The effort to make this island a way-station for migrating wild fowl will be continued, and it is expected that, as the years go on, increasing numbers will not only visit it, but will linger in the nearby open waters through a longer period of the winter. Hundreds of geese commonly winter on Martha's Vineyard. It is but a short flight to Penikese, and as time goes on, when these birds have become aware of the available feed on Penikese, we believe that a combination of food, water and resting grounds will attract them further.

The terns arrived and departed about on schedule. The breeding season was unfavorable, but with a larger production of young than the previous year. These (100 in number) were banded.

The few remaining quail have stayed on the island and raised a small flock.

A good stock of cottontail rabbits was on hand at the beginning of the breeding season and they bred well. Beginning in the early part of September and extending over a brief period, 240 cottontails were trapped and shipped to the mainland for restocking purposes (see Game Distribution).

The white hares did not prosper. It was planned at one time to remove the remnant, but eventually they were left to see if they would re-establish themselves. This did not occur, and the remaining 27 hares were removed and distributed on the mainland.

In the early spring, when there was no danger from fire, the frame buildings formerly occupied by the lepers were burned down and the debris piled into the foundations and partly covered over. Off and on during the spring the caretaker continued digging to enlarge one of the fresh-water ponds which was later enlarged by blasting.

During the summer the usual amount of vegetable food was grown for winter feed for the rabbits.

During the latter part of August an expert blaster levelled, with dynamite, what had been the house of the former resident doctor, and the adjoining buildings. The latter were built of steel-inforced concrete. They were too large to be of practical use in connection with the island as a sanctuary, and would have only cost large sums in annual upkeep, for no useful purpose. A small wing of the main building has been retained and made over into a bungalow for the resident caretaker. The caretaker worked in cooperation with the Biological Survey in the census of waterfowl, and the island was a bird banding station during the summer and fall of 1927.

OTHER SANCTUARIES

The buildings on the Henry Cabot Lodge Bird Sanctuary (Egg Rock) were removed as a result of an appropriation of \$400 for that purpose, and the island is now restored to its primitive condition. A careful study will be made to ascertain whether unobstrusive catch-basins to hold fresh-water for birds can be built, and whether food supplies can be grown on any part of it.

The Isaac Sprague Bird Sanctuary (Carr Island) is being gradually stripped of its buildings. This year a large hen house, the large barn, and the cottage house were removed. The lumber from these buildings was salvaged, rafted across to the mainland and will be used in repairs, replacements and new construction at the game farms and fish hatcheries. In this work gifts of money totalling \$150, given for this purpose, were used (see Acknowledgments), together with \$450 from our appropriations, and labor of wardens. The remaining buildings (or, at least, the two-story boat house) should be removed and the island restored to its primitive condition. It bears a splendid growth of trees and has possibilities as an all-round sanctuary. In particular the fresh-water pond should be restored by building a new flume and repairing the embankments. There are springs in the bottom of this pond, and if the dam and dikes can be built up to the point of excluding the salt water at a high course of tides, a splendid fresh-water pond could be provided on the main migration line along our coast. When once fully developed this sanctuary should be another splendid way-station for feeding and watering our migratory birds.

The Watatic Mountain Wild Life Sanctuary was enlarged by the addition of an adjoining tract of 39 acres on which there is an equally fine spruce growth, giving a total area of 139 acres. (See Acknowledgments)

A new sanctuary was added to our holdings by the gift (see Acknowledgments) of 137 acres of land on Little Wachusett Mountain, in Princeton. This comprises both woodland and open country, with a variety of shrubbery and underbrush which will furnish ideal homes for wild life of various kinds. The State has commemorated the gift by a bronze tablet, which has been affixed to a large boulder on the sanctuary, near the State highway from Princeton to Gardner and Fitchburg.

The land adjoining the game farm at East Sandwich (the so-called Hoxie property), given to the State by the Associated Committees for Wild Life Conservation, Inc. is a valuable addition to our holdings. It comprises marsh, meadow and upland of typical Cape Cod character, and is bordered on one side by a small State pond, on other sides by Scorton Creek and Mill Stream, being separated from the present game farm by the latter. This stream can be dammed up at a reasonable cost to flow a large fresh-water pond on the edge of the salt marsh. On the land are other spring holes surrounded by clumps of well-grown trees. On this area, in the early spring and during the breeding season, are to be found an unusual variety of song and insectivorous birds. This gift establishes the first public fishing ground ever provided in the State. Prior to the transfer to the Commonwealth certain adjustments of small parcels of land were made with Henry Johnson, an adjoining cranberry-bog owner, that will permit of a fine entrance to the sanctuary and game farm being built from the main State road on the Cape.

There were no funds available for the development of any of the other sanctuaries, and there is nothing of special note to record in connection with Ram Island or the Knight Bird Refuge.

Reservations under Sections 69-75, Chapter 131, General Laws

The term of the Mansfield-Foxboro Reservation expired on October 18, 1927.

INLAND FISHERIES

GENERAL

(Additional details concerning the individual species will be found under Propagation of Fish and Game, and Fish Distribution.)

For several years we have annually stressed the need of further restriction on the fishing in our inland waters, particularly in the great ponds. We have repeated, over and over again, about all that can be said on this subject. We have stated, over and over again, that we do not

believe that our ponds can stand the drain of the present volume of fishing. Our Massachusetts ponds are stocked with pickerel, horned pout, white and yellow perch and blue gills, together with large-mouth and small-mouth black bass. None of these fish except the small-mouth black bass, can be artificially propagated to the same extent and by any such methods as those by which we are now producing trout. We are carrying on the propagation of small-mouth black bass along the accepted lines of bass breeding, but the production is limited and the processes laborious and expensive.

We have provided short closed periods, during the breeding seasons of the pond fish enumerated above, have established minimum lengths and daily catch limits, and prohibited their sale; but we still continue to fish these species, on the average, ten months in each year.

Limited quantities of such fish can be produced by the pond cultural method (which consists of placing selected brood stocks in ponds which can be drained out flat for the collection and distribution of the small fish), and salvage operations (which consist in trapping fish out of waters closed to public fishing and liberating them in open waters); but we will always have to rely, for the most part, on natural production. Our ponds differ from our streams in that natural conditions are less disturbed and changed than is true of our trout brooks. In other words, natural breeding conditions continue, in the main, unchanged in our ponds. But in respect to those species where we must rely on natural reproduction we are permitting long open seasons of approximately ten months, while there is only three and one-half months of open season on our artificially propagated trout. Certainly the inconsistency of this scheme must be apparent to any one.

When we first began advocating further restrictions on the length of season of our pond fish we received very little encouragement or support throughout the State. But, as time goes on there is evidence of a great change of sentiment. When, in the fall of 1925, we submitted to the 150-odd local fish and game clubs various propositions for legislation, we put this question—"Do you favor a closed season in all our inland waters, on all fish (except trout) for the period of January 1 to July 1?" Of the 52 clubs answering our questionnaire 14 voted in favor of such closed season and 38 still oppose it. Five years ago we doubt whether a single association in the State would have voted in favor of the proposition.

The period mentioned covers the season from the time that pickerel are beginning to collect on the spawning grounds, on through the spawning seasons of most of our pond fish. It is now broken up with many short closed seasons on the several species. The proposed arrangement would permit of some winter fishing (in December) while still giving our ponds a much-needed rest; would protect all of our fish during the breeding season, which is a fundamental requirement of all successful propagation; and would greatly simplify our problems of law-enforcement and make for greater efficiency in this branch.

We believe that if this plan were given a fair test over a five-year period, our fishermen would never seek to change it.

BROOK TROUT

The opening of the brook trout season is a red-letter day in the lives of our fishermen. During this past season they were subjected to an almost unbearable restraint, due to the fact that the opening of the season (normally April 15) was postponed by reason of drought. Under existing law His Excellency the Governor has authority to exclude all persons from the woodlands when fire hazards make this action advisable. Such conditions prevailed this year. His Excellency expressed great sympathy with the rank and file of our fishermen who were keen to start, and delayed action as long as was practicable, hoping for rain; but on April 14, by proclamation, he closed the woodlands not only to fishermen

but to the entire public, with assurances to the fishermen that the season would be extended on the other end by the number of days it should remain closed. In this action he was supported by the officers of this department and the general public, for it is self-evident that if we are to retain our trout streams in even their present volume and temperature it is necessary to preserve the forests. By a second proclamation the season was opened on April 23 and extended to August 8 (8 days beyond the usual end of the season) thus restoring to the fishermen the lost days.

Owing to the heavy plantings of trout from six to ten inches in size, more fish were taken throughout the State than in many years.

LOCH LEVEN, BROWN AND RAINBOW TROUT

After several years of effort we now have our own brood stock of Loch Leven trout. While there is little distinction between the so-called brown and the so-called Loch Leven trout, we prefer to refer to them as Loch Leven, for the reason that our stock was built up from eggs brought in from Montana. We feel that the suitability of the brown trout in our larger, warmer streams has already been demonstrated. This species should also have possibilities for restocking a selected number of our great ponds, providing that we can use two-year-old fish for this purpose.

The light stocking of some of our larger streams (particularly in the western part of the State) with rainbow trout in recent years has demonstrated the suitability of this fish for at least a portion of our trout waters.

CHINOOK SALMON

We have continued limited plantings of Chinook salmon fingerlings in certain of our ponds which, from past experience, seem favorable for these fish.

WHITE PERCH

The usual salvage operations were conducted at Tashmoo Pond on Martha's Vineyard. As the years go on we believe that the results from stocking with white perch justify our efforts along this line.

PIKE PERCH

The pike perch seem to be holding their own in the Connecticut River. It is hoped that in time the supply will increase to such an extent that we may be able, each spring, to collect a sizeable quantity of eggs. Such eggs could be hatched in a temporary battery set up on the shores of the river near the spawning ground, where the fry could immediately go to the river after hatching.

PICKEREL

As mentioned in other parts of this report, we continue to stress the need of further protection to the pickerel by some limit on the present open season. The pickerel is the most popular fish in the State, taking our anglers as a class. While relief from excessive fishing is the first requirement to bring back the pickerel stock, this should be supplemented by the establishment of additional rearing units similar to the Stockwell Ponds (hereinafter reported upon) and the fitting out of additional salvage units.

SMELT

There has been little change in the status of the smelt. On the South Shore it is a question of keeping the remaining spawning grounds free from pollution and the fish free from disturbance during the spawning season. On the North Shore the latter problem is the chief one. The fishing season, taken as a whole, would indicate a slight falling off in supply in both regions. It is a marvel that these small, delicate fish have been able to adapt themselves to the changing conditions in the few spawning areas still left, and to persist in the face of the amount of disturbance by lawless fishermen which they have encountered during the

spawning period. There is still an opportunity to preserve this splendid fishery on at least some sections of our coast, but it can only be done either by the riparian owners cooperating in setting aside the land adjoining these spawning grounds to be part of the general breeding grounds, in order that we can effect better law enforcement, or by the Commonwealth taking, by eminent domain, strips of land on either side of these spawning grounds in order that the public can be absolutely excluded during the spawning season.

We renew our recommendation that the license law should be extended to include smelt fishermen, in order that funds may be available to do more work on behalf of the smelt. Also that the commercial fishing for smelt should be prohibited.

BASS

We have continued our policy of limiting the planting of bass to a selected list of ponds in which they are already established, instead of making indiscriminate plantings in increasing numbers of our waters. The bass fishing this year was the best in several years.

HORNED POUT

The horned pout continues as one of our most popular fish. Interest in it is increasing probably more rapidly than in any other, and its value as a food supply and its edible quality is becoming more fully appreciated. The horned pout can be satisfactorily produced by the pond cultural method, and we shall direct our efforts to increasing the supply available for distribution.

PONDS

Public Rights

We have predicted a growing interest by the public in the laying out of public rights of way to our great ponds. The general right of the public to cross private lands in order to go on to our great ponds has been the subject of various opinions by former Attorneys General. There have been some court decisions, but the matter is still surrounded with considerable doubt and vagueness. However, the recently enacted law (Chapter 453, Acts of 1923) makes it possible for ten or more residents of the Commonwealth to petition the Department of Public Works to lay out a public right of way where public necessity makes this advisable.

Since the enactment of that law the Department of Public Works has acted on petitions to establish rights of way to the following great ponds:—

Long Pond, Lakeville. Petition heard Oct. 24, 1923. Petition dismissed as this pond is used as a source of water supply.

Long Pond, Blandford. Petition heard May 1, 1924. Report made to Legislature, House No. 209 of 1925, resulting in the passing of Chapter 102, Acts of 1925.

Glen Echo Lake, Stoughton. Petition heard June 25, 1924. Report to Legislature, House No. 178 of 1925.

Little Pond, Sherborn. Petition heard May 14, 1925. Report to Legislature, Senate No. 19 of 1927.

Island Creek Pond, Duxbury. Petition heard Nov. 19, 1925. Report to Legislature in House No. 227 of 1927, resulting in the passing of Chapter 186, Acts of 1927.

South Pond, Savoy. Petition heard March 18 and 25, 1926. Report to Legislature in House No. 123 of 1927.

Two petitions are now pending, one regarding Walkers or Bucks Pond, Harwich (heard December 2, 1926); and one concerning Flax Pond, Brewster (heard February 3, 1927). No decision has yet been reached by the joint board.

From the beginning of our colonial government until 1869, free fishing (as well as other rights) was preserved to the inhabitants of the

Commonwealth in all natural great ponds of ten acres and upwards. That public right remained intact for more than 200 years. In 1869 these public privileges were abridged by Section 8, Chapter 384 of the Acts of that year, which reads as follows:

"The fishery of any pond the superficial area of which is more than twenty acres, shall be public, except such as may have been granted specially by law or leased as hereinafter provided, and all persons shall, for the purpose of fishing, be allowed reasonable means of access to the same without rendering themselves liable to prosecution or action for trespass."

The essential part of that law is retained in our General Laws, Chapter 130, Section 24, which reads:

"The fishery of a pond, the area of which is more than twenty acres, shall be public, except as hereinafter provided; and all persons shall, for the purpose of fishing, be allowed reasonable means of access thereto."

Upon referring to the annual report for the year 1869 it is apparent that this change in the law was the result of a recommendation by the then Commissioners of Fisheries. The main purpose of the change seemed to be to encourage the artificial propagation of fish in natural great ponds between 10 and 20 acres.

The experience of the succeeding years shows conclusively that the passage of this law did not result in the riparian owners, (who were given the exclusive control over the fisheries in these natural great ponds between 10 and 20 acres) embarking on the propagation and protection of fish. Rather it took away from the public the right of free fishing in these natural great ponds between 10 and 20 acres, without any compensation, and without any resulting benefit to the fisheries.

The public should never have been deprived of these rights, and we feel certain that when the situation is fully understood there will be an irresistible demand for their restoration.

Great Ponds Stocked and Closed

Up to the present year it has been our practice, when stocking ponds under Section 28, Chapter 130, General Laws, to apply to all ponds a uniform set of rules during the three-year period in which regulations are applied to the fishing. The regulations close the pond to all fishing except between May 30 and October 31 inclusive of each year; and close the tributary streams except between April 15 and July 31 inclusive, until the date the regulations expire. Fishing is permitted only with a hand line and single hook, or with a single hook and line attached to a rod or pole held in the hand. These regulations are known as "Form 1."

During the year the city and town governments (on whose request action is taken) were given the choice of having the old regulations applied, or modified regulations by which fishing is permitted with not more than two hooks and lines (a plug, spinner or artificial bait rigged with triple or gang hook to be considered as one hook), subject to all laws relative to the open seasons on the taking of fish. These regulations are known as "Form 2."

The following-named ponds were stocked with regulations, Form 1, expiring (except as noted otherwise) November 1, 1930:

Nesseponsett Pond, Dana and New Salem (from Feb. 1, 1927 to Nov. 1, 1929).

Great or Ashfield Pond, Ashfield

Massapoag Lake, Sharon

Nippenicket Pond, Bridgewater

Fort Pond, Littleton

The following-named pond was stocked under Regulations, Form 2, expiring Nov. 1, 1930:

Scaddings Pond, or Sabbatia Lake, Taunton.

Boundary in Congamond Lakes

Negotiations between the fish and game departments of Massachusetts and Connecticut resulted in an agreement covering the enforcement of the fish and game laws of the respective states on Congamond Lakes, Southwick.

Markers were set up on the opposite sides of the entrance to Pickerel Cove in South Pond, with notices informing the public that the waters on the cove side of a line drawn from one marker to the other will be under the jurisdiction of the State of Connecticut. The remaining portions of the ponds will be under the jurisdiction of Massachusetts.

Any one fishing in Pickerel Cove inside of a straight line drawn from one marker to the other, or fishing from the Connecticut shore, in any part of the Congamond Lakes, will be required to have a Connecticut fishing license.

Any one fishing any part of Congamond Lakes from the Massachusetts shore, or from the water anywhere (outside of a line drawn from marker to marker in Pickerel Cove) will be required to have a Massachusetts license.

The foregoing arrangement is to serve simply as a *modus vivendi* and is not intended to affect the legal boundary between the States.

Privately-owned Ponds Stocked

In last year's report we discussed at length the advisability of removing from the present license law the provision that a sporting license is required for fishing only those inland waters which have been stocked by the Division since January 1, 1910, to the end that such sporting license would be required of all persons who fish any of the inland waters of the Commonwealth. We made a recommendation to the Legislature to this effect, which was favorably reported by the Committee on Conservation, but failed to pass in the Senate.

In order to extend the operation of the law and increase the revenues of this Division, much time of our office force was spent, during the year, in obtaining the consents of persons owning the land and water rights around the natural great ponds under twenty acres in area, and owners of privately-owned waters, to a stocking of the same by the State.

Following is a list of such ponds which were stocked during the period of this report, on the stipulation of the riparian owners that the public may fish therein for the period indicated (in most cases, 10 years):

<i>Pond</i>	<i>Town</i>	<i>Fishing permitted to</i>
Assabet Mill Pond	Maynard	Sept. 28, 1937
Agawam Mill Pond	East Wareham	Nov. 16, 1937
Bullardville Pond	Winchendon	Apr. 22, 1937
Barker Pond	South Acton	Sept. 28, 1937
Boon Pond	Hudson, Stow	Sept. 28, 1937
Brookside Pond	Westford	Nov. 8, 1937
Bennetts Brook Pond	Ayer	Nov. 8, 1937
Clear Pond	Carver	Apr. 9, 1937
Clarks Pond	Amesbury	June 10, 1937
Deans Pond	Oakham	Nov. 16, 1937
Duck Pond	Dennis	Apr. 28, 1937
Elbow Pond	Plymouth	May 31, 1937
Flanagans Pond	Ayer	March 29, 1937
Falls Pond	No. Attleboro	Nov. 2, 1937
Fredonian Mill Pond or Double Pond	Shirley	Oct. 4, 1937
Green Sea	W. Brookfield	June 3, 1937
Groton School Pond	Groton	Sept. 28, 1937

Goddard Pond or Ripple Lake or Pratts Pond	Grafton	June 17, 1937
Gardner Lake	Amesbury	Nov. 8, 1937
Hazelbrook Pond	Wayland	May 17, 1937
Hunt's Pond	Brockton, Abington	Apr. 22, 1937
Highland Lake	Norfolk	Apr. 8, 1937
Hammond Pond	Brookline	Apr. 30, 1937
Howard Pond or Winchendon Reservoir	Templeton	Nov. 21, 1937
Huckins Pond or Pratt Pond	No. Grafton	June 17, 1937
Harris Pond	Stoughton	Oct. 28, 1937
James E. Whitin Mill Pond	Uxbridge	Nov. 25, 1937
Kendall Pond or Daniels Pond	Gardner	Nov. 21, 1937
Lower Naukeag Lake	Ashburnham	Oct. 16, 1936
Lower Mill Pond (Stony Brook System)	Chelmsford	Apr. 27, 1937
Lakeview Pond	Foxboro	Sept. 26, 1937
Middle Mill Pond (Stony Brook System)	Chelmsford	Apr. 27, 1937
Moore's Canal	Chelmsford	Apr. 27, 1937
Mechanic Pond	Attleboro	Nov. 12, 1937
Merino Pond	Dudley	May 11, 1937
Mirror Lake	Wrentham, Norfolk	Sept. 26, 1937
Mud or Muddy Pond	Westminster	June 11, 1937
Muzzy Meadow Pond	Spencer	Nov. 23, 1937
New or Willett Pond	Norwood, Walpole, Westwood	Apr. 5, 1932
Orcutt Pond and Brook	Orange	Dec. 18, 1936
Peter Pond	Dudley	May 11, 1937
Phoenix or Double Pond	Shirley	Oct. 4, 1937
Reeds or Spring Lake Pond	Rockland	Apr. 20, 1937
Scoux or Scoke Pond	Plymouth	Apr. 22, 1937
Stoney Brook Pond	Norfolk	Apr. 8, 1937
Sweets Pond	West Mansfield	Apr. 19, 1937
South Acton or Faulkner Pond	Acton	Sept. 28, 1937
Tuxbury's Pond	Amesbury	Nov. 8, 1937
Upper Mill Pond (Stoney Brook System)	Westford, Chelmsford	Apr. 27, 1937
Upper Dam Pond	Foxboro	Sept. 26, 1937
Witch Pond	Foxboro, Mansfield	Apr. 19, 1937
Westville Pond	Taunton	Nov. 23, 1937

Following is a list of privately-owned ponds, stocked with the consent of the owners, but without the stipulation permitting the public to fish therein for a period of years.

<i>Pond</i>	<i>Town</i>
Duck Pond	Wellfleet
Higgins Pond	Wellfleet
Long Pond	West Rutland
Mt. Hope Mill Pond	North Dighton
No. Triangle Pond	Plymouth
Plympton Pond	Walpole
Turners or Morey's Pond	Walpole
Turners Pond	Milton
Vose Pond	Groton

In both groups of waters it is necessary that a sporting license be purchased in order to fish them.

The following privately-owned ponds were stocked on agreement by the owners to permit the Division, in future, to take an equal amount of stock from the resulting increase:—Pond at Wayside Inn, Sudbury, owned by Henry Ford, blue gills; Shawsheen Village Pond, Andover, owned by People's Ice Company, Andover, brook trout.

Breeding Areas in Great Ponds

Upon a petition (received in October, 1926) from the town of Webster, that portion of Lake Charbunagungamaug (also known as Webster Lake) that was cut off by the construction of the New York, New Haven and Hartford Railroad Company abutting land owned by Timothy Toomey and others on Thompson Road in the town of Webster, was set aside as a breeding area for food fish of all species, for five years from January 1, 1927, with the following regulations:

"No fish of any species shall be taken from said waters without the written consent of the Director of the Division of Fisheries and Game—provided that employees of the Division may take fish for re-stocking purposes."

Violation of the law carries forfeiture of license and fine not exceeding twenty dollars.

This is the first town which has taken advantage of the opportunity afforded by Chapter 191, Acts of 1924, to provide sanctuaries for the breeding of fish in the ponds within their borders.

A petition for similar action on Lake George, also known as Wales Pond, in the town of Wales, was received and acted on, but the regulations do not become effective until the period of the next report.

FISHWAYS

Three new fishways were installed on alewife streams during the year, namely: Mill Creek, Sandwich; Herring River, Brewster; and on the outlet to Robbins Pond, East Bridgewater.

Continuing the practice of other years, all fishways were examined periodically during the spring run of fish, and the flow of water regulated from the beginning to the end of the run. At the Lawrence fishway, observations and the regulating of the flow of water through the fishway were handled by a man engaged especially for the purpose, and paid by the Commonwealth. On all other fishways, these duties were performed by the Division's own wardens, and frequently employees of the mill companies, who recorded the species passing through the fishway day and night.

A brief report on the more important fishways is as follows:—

Saugus River

Universal Tide Power Company.—The fish surmounted this dam at East Saugus without difficulty during the spring run. There is no fishway at this dam, and none is necessary since there are times when, in the course of the company's operations, there is a sufficient flow of water over the dam to permit the alewives to surmount and pass upstream. By next year it is probable that some of the timber will be gone from the dam which will make conditions even better.

Wallace Nutting Dam.—Observations were made on the new fishway installed on this dam in 1926, at various times during the spring run of fish and while none were reported actually seen in the fishway, good runs were reported in the river in general up as far as this fishway.

Prankers Pond Fishway.—The new fishway installed on the property of the United States Worsted Company at Prankers Pond (the next obstruction above the Wallace Nutting Dam) was in operation during the

spring run of fish for the first time since its completion. The employees of the company regulated the flow of water and made periodical observations for different fish using the fishway, but none were observed. About the end of May, it was reported to this office that the United States Worsted Company, on whose property this fishway was located, had gone out of business and had sold the property.

Collins Fishway.—This fishway located in North Saugus, the completion of which opened up the entire Saugus River from the sea to the headwaters, was in operation during the spring run of fish for the first time since its construction and was found, upon periodical observations and inspections, to be functioning properly.

Ipswich River

Ipswich Mills Fishway.—This fishway was in operation from April 20 to June 6. The weather during the month of May was so rainy and cold, along with the heavy freshets, that it looked for some time as though there would be no run of alewives in this stream. But they finally came along in very large schools. From May 19 to 29, there were many more fish observed in this fishway than have ever before been seen. From June 1 to June 6, very few fish were seen. During the entire spring run, no fish other than alewives were seen either in the river or the fishway.

Norwood Mills Fishway.—Frequent observations were made on this fishway during the spring. Large numbers of yellow perch and pickerel were observed outside, one of the latter measuring 16 inches. As for the alewife in the Ipswich River we have this species well started and in the course of a few years the fishery should be of some little importance. It is the opinion of those familiar with this stream that most of the alewives spawn on the several reaches of still water between the Ipswich Mills and Norwood Mills fishways. As the run increases from year to year, the alewives will doubtless work farther and farther upstream.

Willowdale Dam.—Periodical inspection was made of this fishway from the time the river opened up, early in the spring, until the latter part of June, and it was found to be functioning properly at all times.

Merrimack River

Lawrence Fishway.—The flume on the Lawrence fishway which connects the fishway with the dam was connected on April 28 and observations began on the 30th. A big run of fish was reported from May 17 to June 15, after which time no fish were seen. Extensive repairs were made on this fishway after a period of 6 years since its construction, these being made necessary by the exposure of the fishway to severe weather, ice and snow.

Lowell Fishway.—This fishway was in operation during the spring run of fish and periodical inspections were made by members of this Division.

Paskamansett River

Cummings Fishway.—The fishway located at Russell Mills, South Dartmouth was inspected during the spring run and the same conditions found to exist as in the past. Certain changes and corrections are necessary on this fishway before it will function properly and plans for the accomplishment of this are now being made.

Taunton River System

East Taunton Fishway, Raynham.—The first alewives appeared below this fishway on March 19, during an unusually warm spell of weather. The weather becoming cold again they went back into deep water and did not return to the fishway until April 1. There was an unusually heavy run the last two weeks of April and the first two weeks of May. Repairs were made in the top compartment of this fishway, thereby enabling the fish to reach the river above with less effort and in greater numbers.

Jenkins Leatherboard Company Fishway.—This fishway was in operation during the spring run. The first alewives were observed as early as May 2 and were seen from then on in large numbers below the dam and in the raceway back of the mill. On May 10 and 19, large numbers were seen passing through the fishway. At one time during the spring run as many as 200 alewives were seen below the dam of the Stanley Works, the next obstruction above this fishway, proof that this number at least had used the fishway to ascend to the headwaters.

Stanley Iron Works Fishway.—Numerous observations were made by a representative of this Division and also by employees of the foundry. On May 17 and 23, large numbers of alewives were observed in this fishway. Late in May, alewives were observed pocketed below the dam. This Division installed a screen to act as a leader, thereby directing these alewives to the lower compartment of the fishway. On May 17, 130 adult alewives were collected at East Taunton and planted above this fishway. No alewives were observed in the vicinity of this fishway after May 23.

Easton Investment Company Fishway.—Careful observations were made at this fishway from April 3 to June 1, but perch, an occasional pickerel, and very great numbers of suckers were the only fish observed in the river, with the exception of two live alewives and a few dead ones near the dam.

Hanson Cedar Company Fishway.—This fishway was inspected during the spring run of fish, and, as stated in previous reports, operates properly when there is sufficient water in the river. Alterations will be made on this fishway eventually.

Carver Cotton Gin Company Fishway.—This fishway was in operation during the entire season and was inspected frequently. No alewives were observed at any time and it is more or less of a mystery why they do not appear in this branch of the Taunton River System at East Bridgewater. A number of yellow perch were seen early in May below the fishway. After another year of careful watch for alewives, the owners will be requested to proceed with the changes necessary to enable all species of fish to ascend the fishway.

Electric Light Power Plant Fishway and Star Mills Fishway.—These two fishways located on the Nemasket River, Middleboro, were in operation as usual during the spring run of fish and observations were made by representatives of this Division from time to time. Large numbers of alewives were seen passing through them without difficulty.

Agawam River—E. Wareham

The usual observations were made in this fishway which was found to be operating properly. A large number of fish ascended without difficulty.

Monument River

Bournedale Fishway.—Frequent observations were made in the fishway located on the Cape Cod Canal and this was found to be functioning satisfactorily during the run of fish.

Mill River—Sandwich

Early in the spring the owner of the old mill located at the outlet to Shawme Pond, Sandwich, indicated her willingness to proceed with the installation of a fishway on her property. This is the second instance where the owner of a dam has taken the initiative in complying with State regulations concerning fishways.

A conference was held, a survey of the premises made, and the owner agreed to install a fishway at once along the lines indicated and in a manner which would be satisfactory to this Division. This fishway was in operation during the spring run of fish.

Cole's River—Swansea

Montaup Electric Company Fishway.—This fishway was inspected periodically during the spring run of fish and while the fishway itself was in operation to permit fish to ascend, there are minor changes still to be made in this fishway to enable fish to surmount without difficulty.

Herring River—Brewster

Herring River, Brewster.—The owner of the old mill located on Stoney Brook, Brewster, otherwise known as Herring River, early in the spring requested the services of this Division in connection with the installation of the proper type of fishway on his property. A conference was held early in March, a survey made by the Division's engineer, plans and specifications submitted to the owner, and early in April he reported the fishway completed and in operation in sufficient time to enable fish to ascend to the headwaters.

Robbins Pond—East Bridgewater

United Cape Cod Cranberry Company Fishway.—A new fishway was constructed on the property of the United Cape Cod Cranberry Company at the outlet to Robbins Pond, East Bridgewater, during the early spring, thereby giving the alewives and other anadromous fish a clear passage to and from this pond. The fishway was inspected periodically during the spring run of fish and found to be functioning properly.

POLLUTION

All pollution problems called to the attention of the Division during the year were investigated and corrected wherever possible.

PROPAGATION OF FISH AND GAME

FISH HATCHERIES AND GAME FARMS

General

We have followed the plan, laid out some time ago, of making repairs and replacements at the game farms and fish hatcheries, together with such new construction as may be necessary, to put all of our plants in first-class condition before enlarging their productive capacities. There still remains a great deal to do, not only in the upbuilding of these units, but in the purchase of lands which we have carried under lease for some years. In the selection of fish hatchery sites we must go where suitable water is to be found. This often necessitates the building of homes for our superintendents and assistants on account of the lack of housing facilities near such locations.

We have established a definite policy of carrying all our brook trout (except culled stock) through the winter to be liberated in the spring as adult fish; also of either carrying the year's production of pheasants through for liberation in the spring as breeding birds, or to accomplish the same end by turning them over to individuals and clubs to be wintered and liberated. Of the yearlings distributed during the trout distribution periods, 207,889 were six inches and upwards in length, which is the largest distribution of its kind in the history of the State. (See table for complete distribution, in the section on Fish and Game Distribution.)

The reforestation program was continued, as noted under the individual stations, with spruce, Scotch, red and white pine, furnished by the Division of Forestry.

During the course of the year Mr. Arthur R. G. Booth of the Water Laboratories of the State Department of Public Health made a survey and detailed report of the water supplies at our fish hatcheries. We believe that a permanent record, over a period of years, of the analyses of

the water at each hatchery may be useful if at any time we are called on to combat disease.

In line with our plan to have our game farms checked up at intervals by outside authorities, such an inspection was made by Dr. J. C. Graham of the Massachusetts Agricultural College at Amherst. In due course his report was received, including recommendations for consideration in the future operation of these stations.

Amherst Rearing Station

The 12 x 20 addition to the superintendent's cottage was completed, wiring extended to the new part, and fixtures installed in all the rooms. The entire interior was painted and papered, hot-air heating plant and complete water system installed, including tank and pump, and complete bath room and kitchen sink. A new kitchen range replaced the old one. A new chimney was built, complete system of spouting was added, front porch and rear porch built, and the whole exterior of the house painted. A concrete septic tank was built.

An addition was made to the temporary garage near the house, and a one-ton truck purchased, the first truck we have ever had at this station. Additional grading was done around the superintendent's house and the adjoining grounds.

The large pools, for which the ground was cleared last year were completed up to the point of building the wooden dams. Concrete dams were installed at several points to replace worn-out wooden dams, and the ponds widened and deepened as part of this work.

The posts were set up for a new fence along the grounds bordering on the State road.

As part of a new underground system to take the place of the present open wooden supply troughs, 100 feet of three-inch galvanized iron pipe was laid.

With funds contributed by the clubs (see Acknowledgments) two tracts of land were purchased, and the necessary sum is on hand to take over a third tract on which is a greater water supply than exists on the present hatchery grounds. These purchases were necessary in order that we would have sufficient area to take full advantage of the lay of the land in the utilization of our water supplies. In addition we purchased from Superintendent Horst, certain gravel rights which he had acquired from the Holyoke Street Railway Company in land on the opposite side of the State road from the hatchery. This cleared the title to one of the parcels of land purchased, insured our supply of sand and gravel for an indefinite period, and will facilitate the handling of flood waters which are troublesome each spring. 3,800 trees were planted on various parts of the hatchery grounds from the Forestry Division, and in addition 80 black walnut trees.

Brook Trout.—To the 23,702 fingerlings on hand December 1 there were added 3,600 from the Montague Rearing Station and 3,200 from the Sutton Fish Hatchery. 5,632 were lost and 24,870 were transferred to yearlings, and distributed.

96,768 fry were received from the Montague Fish Hatchery. 37,768 were lost and 59,000 reared and transferred to fingerlings. 400 of these were lost, 31,600 distributed, and 27,000 remain on hand November 30.

Brown Trout.—The 600 brown trout yearlings on hand December 1 were transferred to adults.

Of the 348 adults on hand December 1 (plus the 600 transferred from yearlings) 220 were lost, 345 distributed (of which 12 went to the Eastern States Exposition, 9 to the Worcester Fair and 24 for display purposes) and 383 remain on hand November 30.

Loch Leven Trout.—Of the 9,200 fingerlings on hand December 1 there were 1,200 lost and 8,000 transferred to yearlings. 300 of these yearlings were lost, 7,500 distributed, and 200 remain on hand November 30.

Of the 1,181 yearlings on hand December 1 there were 31 lost and 1,150 transferred to adults. 200 of these adults were lost, and 950 remain on hand November 30.

72,645 fry were received from the Palmer Fish Hatchery, of which 30,000 were lost and 42,645 reared and transferred to fingerlings. 13,085 were lost, 15,560 distributed (60 of these went to the Worcester Fair), and 14,000 remain on hand November 30.

Montague Fish Hatchery

With contributions from the clubs (see Acknowledgments), supplemented by funds from our appropriation, additional grading was completed around the large pools constructed last year. The fourth of this series of four pools was filled in with stone and topped off with gravel and sand to provide a solid bottom. The banks were resodded and a wooden dam installed at the outlet. The remaining area at the lower end of the hatchery grounds was again heavily dynamited to churn out all of the roots and stumps to put it in condition for the construction of additional large pools for growing trout to adult size. A new bed 500 feet long was dynamited in order to throw the brook to one side of the grounds, that its present bed might be used for these pools; the stumps were collected into great piles for burning when dried out; the new bed of the brook was shovelled out to even up the irregularities of the blast; and a start was made in shaping up the grounds for the proposed new pools.

Certain of the large wooden dams were replaced on the back brook, and the adjoining pools improved. On the main brook the banks between the bridge and the main dam were walled up and a new concrete dam installed at about the middle. As part of this work there was considerable filling and grading of the grounds. In the upper section of the main brook a number of small concrete dams were built to replace wooden dams that had rotted out. The banks of some of the pools made by these dams were walled up with stone to prevent a cave-in, due to the springy condition of the grounds.

A number of large stumps on various parts of the grounds were blasted out. The section of the hillside in front of the camp was graded off, as well as the hillside back of the loading stand. The necessary tile was purchased for conducting water from the upper reaches of the main brook down to the large rearing pools at the lower end of the ground.

The camp was completed inside and outside, and painted. Concrete steps were built up to the piazza, and a retaining wall put in at one end of the porch. A garage with concrete floor and sills was built against the rear of the ice and meat house to house the second-hand Reo truck which was transferred from the Sutton Fish Hatchery. To obtain the lumber for the garage an old storage building was torn down and the rear half of the hatchery building was removed. The remaining part of the building was repaired.

11,720 trees were set out (of which 20 were black walnut).

Brook Trout.—Of the 100,000 fingerlings on hand December 1 there were 3,600 sent to the Amherst Rearing Station, 31,400 were lost, and 65,000 transferred to yearlings. 60,316 of these yearlings were distributed (16 of these to the Eastern States Exposition), and 4,300 lost, leaving 384 on hand November 30.

Of the 800 yearlings on hand December 1 there were 400 distributed and 400 transferred to adults. 100 of these adults were lost, 7 distributed to the Eastern States Exposition, and 293 remain on hand November 30.

300,000 eggs were purchased and 150,000 received from the Sandwich Fish Hatchery. The total hatch of fry was 383,700, of which 96,768 were sent to the Amherst Rearing Station, 30,232 lost, and 256,700 reared and transferred to fingerlings. Of these fingerlings 17,600 were lost, 145,300

distributed (200 of these to the Eastern States Exposition), and 93,800 remain on hand November 30.

Rainbow Trout.—80,000 eggs were received from the Utah Fish and Game Commission in exchange for brook trout eggs. 27,000 fry were hatched and 2,000 reared and transferred to fingerlings, of which 500 remain on hand November 30.

25,000 rainbow trout eggs were received from the U. S. Bureau of Fisheries in May in exchange for brook trout eggs. 20,075 fry were hatched, of which 6,000 fry were lost and 14,075 reared and transferred to fingerlings. 4,075 fingerlings were lost, and 10,000 remained on hand November 30.

4,000 fry were received as a gift from the U. S. Bureau of Fisheries station at Nashua, N. H. 500 were lost, and 3,500 remain on hand November 30.

Of the 9,646 fingerlings on hand December 1 there were 565 lost and 9,081 transferred to yearlings. 4,621 of these were lost, 4,420 distributed (20 of these to the Eastern States Exposition) and 40 remain on hand November 30.

Palmer Fish Hatchery

Superintendent Otis D. Monroe resigned from the service as of May 10, and his son, William F. Monroe, succeeded him.

The superintendent's house was remodelled by tearing away the poorly-constructed ell, building in a new, long window in the dining room, and adding a small porch at the kitchen door. The interior of the house was painted and papered, and the outside painted. The garage also was painted. Minor repairs were made to the Taylor-Huntley house; a new pump installed at the Goodreau house; and new roofing paper put on the shed.

A new loading stand was built, including the piping of water to it, to improve the handling of fish preparatory to and during shipping; and a new loading platform for bass replaced the old, decayed one.

Pond No. 2 was cleaned of mud and vegetation; certain of the bass ponds were filled in with gravel to provide a solid bottom and to insure better drainage when drawn off; three new concrete raceways were built to replace worn-out wooden raceways in ponds Nos. 4, 7 and 8; a new pipe line was installed to connect Ponds Nos. 3 and 7; a new overflow of plank was installed in the new pool; and the banks of certain pools were raised for winter rearing of trout.

During the winter months, all fish cans were given a coat of paint, and during this period much work was done repairing, making and painting screens.

1,500 trees were set out.

Brook Trout.—Of the 29,651 fingerlings on hand December 1 there were 18,700 lost or unaccounted for during the winter, and 10,951 transferred to yearlings. 251 of these were lost, and 10,700 distributed.

200,000 eggs were purchased, 100,000 received from the Sandwich Fish Hatchery, and 15,000 collected from wild trout in waters on the hatchery grounds. 27,900 eggs were lost, 5,000 sent out for planting in brooks, and 282,100 fry hatched. Of the fry 200 were given away for study and experiment, 160,000 distributed to local brooks, and 100,000 reared and transferred to fingerlings. 36,517 of these were lost, 21,220 distributed to local brooks (100 of these went to the Eastern States Exposition), 5,000 sent to the rearing station of the Peabody Fish and Game Association, Inc., and 37,263 remain on hand November 30.

Loch Leven Trout.—100,000 Loch Leven trout eggs were received from the U. S. Bureau of Fisheries Station at Bozeman, Mont. in exchange for brook trout eggs. 97,094 fry hatched, of which 24,449 were lost and the remaining 72,645 transferred to the Amherst Rearing Station.

Blue Gills.—From the supply pond at the hatchery 219 adult blue gills were collected and distributed.

Horned Pout.—From the supply pond at the station there were collected and distributed 2,000 fingerling, 1,500 yearling and 500 adult horned pouts. There were received from the Stockwell Ponds 400 adult horned pout, and these are on hand November 30.

Small-mouth Black Bass.—There were 414 adults on hand December 1. 37 were lost, 8 sent to fairs (4 to the Eastern States Exposition and 4 to the Worcester Fair and thence distributed). The remainder, plus 80 salvaged from Meeting House Pond, Westminster, make a total of 449 on hand November 30. From the bass ponds there were collected and distributed 165,000 fry and 21,475 fingerlings (of which 95 went to the Eastern States Exposition).

Wall-eyed Pike Perch.—500,000 wall-eyed pike perch eggs were received from the U. S. Bureau of Fisheries Station at Swanton, Vt., from which 490,000 fry were hatched and planted.

Sandwich Fish Hatcheries

It is with deep regret that we record the death, on November 16, of Superintendent William M. Monroe. Mr. Monroe entered the State service as assistant at the Palmer Fish Hatchery, and was transferred to the Sandwich Hatcheries on December 1, 1918, succeeding the former superintendent, Frank E. Hitchings. Mr. Monroe represented the best traditions of the fish culturists of the country. He was earnest and successful in his development of these hatcheries, and maintained their production at a high level. No definite decision has been reached as to his successor.

Sandwich Fish Hatchery

The road leading into the hatchery was given a heavy fill of cinders, and the work of widening it begun. A camp, formerly used at the Weymouth Back River, was set up to serve as a dormitory for fish messengers and other temporary help. A supply of lumber from Carr Island was received, for future construction work. A start was made toward the construction of an addition to the meat house.

A 2-inch well was driven, preliminary to constructing a concrete holding pocket to improve the facilities for shipping fish; certain of the concrete pools were repaired by placing in new tie rods running from pool to pool, and re-cemented where the original cement had broken away; racks were built for the pools constructed last year, and additional grading done around these pools.

125 trees were set out.

Brook Trout.—Of the 99,888 fingerlings on hand December 1, there were 20,592 lost, 560 sent to the New England Sportsmen's Show (and later distributed to local brooks) and 78,736 reared and transferred to yearlings. 504 of these were lost, 75,083 distributed (18 of these were for display purposes) and 3149 remain on hand November 30.

Of the 3,629 yearlings on hand December 1 there were 54 lost, and 3,575 transferred to adults. These, plus the 3,371 on hand December 1, made a total of 6,946 handled during the year. 3,940 were lost, 1,406 distributed (6 for display purposes), and 1,600 remain on hand November 30.

1,375,000 eggs were collected from station stock and 25,000 wild brook trout eggs were received from the U. S. Bureau of Fisheries Station at Berlin, N. H. in exchange for brook trout eggs. Fifty-three thousand eggs were lost; 50,000 were sent to the California Fish and Game Commission in return for the Chinook salmon eggs furnished the East Sandwich Fish Hatchery; 50,000 to the Utah Fish and Game Commission in

return for the rainbow trout eggs furnished the Montague Rearing Station; 290,000 to various U. S. Bureau of Fisheries stations in return for the Loch Leven trout eggs furnished the Palmer Fish Hatchery, the wild trout eggs furnished the Sandwich Fish Hatchery, the rainbow trout eggs furnished the Montague Fish Hatchery; 150,000 to the Montague Fish Hatchery; 100,000 to the Palmer Fish Hatchery; and 707,000 fry were hatched. Of these 148,000 were lost, 35,000 distributed to local brooks, 129,000 transferred to the East Sandwich Fish Hatchery, and 2,000 sent to the New England Sportsmen's Show (and later distributed), and 393,000 reared and transferred to fingerlings. 25,290 fingerlings were lost, 96,000 sent to the Sutton Fish Hatchery, 9,000 sent to the East Sandwich Fish Hatchery, 25,000 to the rearing station of the Peabody Fish and Game Association, Inc.; 25,000 to the station of the Canton Fish and Game Protective Association, 60,000 to the station of the Worcester County Fish and Game Association, 52,800 distributed to public waters, and 99,910 remain on hand November 30.

East Sandwich Fish Hatchery

The kitchen of the Nye house was torn down and the new one built on a concrete foundation. The front of the porch was shingled to correspond with the house, and a rock foundation placed under this end of the porch.

The banks of a number of the rearing pools were cut down, and sodded. By these changes there will be no overhang of the banks, thus making it possible to remove planks that formerly had to be kept in position to prevent the banks from sagging in. This not only improved the appearance of the pools, but also the conditions for rearing fish.

The grounds were further drained, unused pools filled in, and additional grading completed.

An old shed used during the egg-taking period for storage was removed and the location graded off.

1800 trees were set out.

Brook Trout.—Of the 33,469 fingerlings on hand December 1, there were 80 lost and 33,389 transferred to yearlings. 106 yearlings were lost, and the remaining 33,283 distributed.

Of the 3,596 yearlings on hand December 1 there were 79 lost, 875 distributed, and 2,642 transferred to adults. 180 adults were lost and 2,462 distributed.

328,500 eggs were collected, of which 64,650 were lost, 42,000 sent to the New England Sportsmen's Show (afterwards planted), and 221,850 hatched into fry. To these were added 129,000 fry from the Sandwich Fish Hatchery. 3,600 were lost, 235,000 distributed to public waters, 112,250 reared and transferred to fingerlings. To these fingerlings were added 9,000 from the Sandwich Fish Hatchery. 25,000 were sent to the rearing station of the Wrentham Fish and Game Association, 5,000 distributed to public waters, 47,600 were lost, and 43,650 remain on hand November 30.

Chinook Salmon.—50,000 eggs were received from the California Fish and Game Commission in exchange for brook trout eggs. 48,550 fry were hatched, of which 1,150 were lost and 47,400 reared and transferred to fingerlings. 498 fingerlings were lost, 12,000 distributed to public waters, 30,000 sent to the rearing station of the Dighton Fish and Game Club, and 4,902 remain on hand November 30.

Sutton Fish Hatchery

The old single pipe hot-air heater in the residence on the grounds was replaced with a new steam-heating system.

The road leading into the hatchery was filled in and graded in places, following damage by flood which washed out the road and destroyed fences.

The camp and office buildings, ice and meat house buildings were painted and minor repairs made.

A new gasoline tank and pump were installed.

A one-ton White truck was purchased to replace the well-worn Reo speed wagon, and a half-ton Chevrolet truck for light trucking in connection with the pond work.

7,500 trees were planted. 1,500 black walnut trees were grown from seed planted in 1926, and more seed collected and planted in 1927 to give expected yield of 1500 to 2000 trees.

Brook Trout.—The year opened with 30,000 fingerlings on hand recorded in the last report, plus 4,700 discovered over the previous count. 3,200 were sent to the Amherst Rearing Station, 1,500 distributed to public waters, and 30,000 reared and transferred to yearlings, and distributed.

The 200 yearlings on hand December 1 were lost.

96,000 fingerlings were received from the Sandwich Fish Hatchery, 51,000 of which were lost, 10,000 distributed to public waters, and 35,000 remain on hand November 30.

Pheasants.—Of the 300 young pheasants on hand December 1 there were 122 lost and 178 distributed as adults.

FIELD PROPAGATION

We have established a definite policy of producing around 225,000 trout of all species in the spring, large enough to be caught when planted. This plan will be adhered to until such time as we can have in operation, pond cultural units for the production of a much larger supply of pickerel, horned pout, perch, blue gills, etc. for the stocking of our great ponds. For many years we have more or less concentrated on the production of trout and the time has come when we should hold that work at about the present volume and go forward with very substantial developments to produce more fish for restocking the over 800 great ponds in which free fishing is guaranteed to our people forever.

Stockwell Ponds Unit.—The fill across the face of the dam at the Arnold Pond was completed and a stone wall built around the upper end of the flume. Another stone wall was partly laid across the lower end of the flume and the general fill on the dam to level it off was nearly completed. The ditches in the Arnold Pond were cleaned out to insure complete drainage and more rapid movement of the fish when the pond is drawn down.

The new dam for which contributions were made by the clubs (see Acknowledgments) was started across the center of Middle Pond. When completed it will be 235 ft. long and 9 ft. high. Stone to keep the fill from spreading was placed in position last winter and spring. A wooden core was built, together with a flume 12 feet wide and 9 feet high, with a concrete bottom. At the base the fill will be 18 feet wide and on top, when the dam is completed, 8 feet. A track was built on top of the core and dump cars used on the fill, which was taken from two points on high ground on either side of the dam. Owing to the lack of funds the fill could be carried only up to the height of 6 feet, but this was sufficient to insure carrying a greater depth of water than ever before in the upper part of Middle Pond during the coming winter. Eventually, when the dam is completed, approximately 25 additional acres of land will be placed under water and the height of the water in the upper part of this pond will be raised at least 6 feet. The work so far has been financed by the \$405 expended from the club contributions, \$350 from the Division's appropriation, and by the payment of bills amounting to \$75 by the town of Webster (to make use of the town's funds appropriated to stock Webster Lake).

An additional concrete flume was constructed in the Putnam Mill Pond to assist in more rapid drawing off of the ponds each fall to remove the stock and as a further protection against flood conditions.

During the winter additional trees and brush were removed from the land to be flowed. There were 1500 trees (Austrian pine, white pine, and spruce) from the Forestry Division planted on the cleared margins of Stockwell Ponds.

The work of drawing off the ponds was not completed in 1926, owing to frequent rains, winter setting in early, and the arrangements for doing the work being not then fully developed; but the fish left were concentrated in Pond No. 1, and early in April, 1927, this pond was drawn, yielding fully 70,000 fish, mostly yearling horned pout, and an ample brood stock that was distributed in the three ponds.

The work for 1927 was started in August by drawing the Sutton Pond into No. 3, and although the work was done in warm weather and the fish had to be run down the rocky bed of the brook, making a descent of about 100 ft., this was done with slight loss, establishing the practicality of taking the fish from the remote Sutton-Thompson Ponds in the traps at the Stockwell Ponds.

In September Pond No. 2 was partly drawn to uncover the bottom and start work at the new dam; and following this, No. 1 was drawn to remove for distribution, some of the excess fish that went into it from No. 2, and to guard against crowding when the regular drawing off, beginning with No. 3, was started.

This work was undertaken early in October when the work on the dam was advanced so that No. 2 could be partly refilled, and although greatly delayed by excessive rains, was completed about November 30.

Pond No. 3 was unfinished when a heavy rain refilled it on October 13, but was again drawn and finished before the flood of Nov. 4. This flood filled all the ponds to a high level, requiring a week of heavy flow to get them down to a working condition, which was again interrupted by a heavy rain November 18; but by this time the new dam could be used for holding water back, and the work was satisfactorily completed.

While the season was the most extreme for high water that could be expected at any time, the work was finished at not much later than the normal time, and it can be considered that the system has been sufficiently developed with run-off and storage facilities to carry the work through under any conditions of unseasonable weather. Any further development of ponds will improve the conditions for handling fish more in proportion than it will increase the work.

The greatest damage from the delay caused by the flood conditions, seemed to come from holding the fish concentrated in limited areas, where the larger ones could feed freely on the smaller ones, and ample evidence was found that the larger ones were continually gorged, with the loss falling mostly on fingerling pickerel, and fingerling or yearling blue gills, the brood pickerel showing an especial preference for yearling blue gills. This condition was in part due to holding the water at a low stage for work on the dams, and can be regarded as easily avoidable when drawing down and completing each pond in turn, by starting from the head of the system.

The brood stock sorted out and returned to the ponds as the work progressed consisted of pickerel, horned pout and blue gills, 1,500 to 2,000 to each pond, except that the proportion of pickerel was increased and some horned pout were reserved for any new pond that might be completed early in the next season.

Distributions from the ponds for the period of this report (December 1, 1926 to November 30, 1927) were: 93,700 blue gill fingerlings; 2,605 blue gill adults (40 to Eastern States Exposition and 40 to the Worcester Fair); 6,220 horned pout fingerlings (20 to the Worcester Fair); 97,465 horned pout yearlings and adults (45 to the Eastern States Exposition, 20 to the Worcester Fair); 1,100 pickerel fingerlings; 1,956 pickerel adults (3 to the Worcester Fair and 3 to the Eastern States Ex-

position); 6,100 yellow perch fingerlings; 940 yellow perch yearlings and adults (4 to the Eastern States Exposition and 36 to the Worcester Fair); 1 adult small mouth black bass to the Worcester Fair; 75 adult sunfish to the Worcester Fair. In addition there were 500 horned pout yearlings and adults sent to the U. S. Bureau of Fisheries at Hartsville for experimental purposes, and 400 to the Palmer Hatchery for additions to the brood stock.

Sutton-Thompson Unit.—The enlargement and development of the pond cultural work in this vicinity was substantially advanced. A tract of 26.5 acres was leased from the town of Sutton, and 34.4 acres (adjoining the Sutton tract) were leased from George H. and Mamie F. Thompson. These leases are for five-year periods, with an option of purchase at fixed prices. The acquisition of these properties will permit of the enlargement of a ten-acre pond lying partly on each tract. Also the construction of an additional fifteen-acre pond on the Thompson tract, and, later on, the construction of an additional five-acre pond on the Sutton tract. Both properties were surveyed.

The dam on the Sutton tract was repaired by the construction of a new concrete overflow, the old flume torn out and replaced with concrete, and leaks in the dam stopped. A concrete flume was built on the side of the dam to be built on the Thompson property, and a pipe laid to connect this pond with the Sutton pond. A stone wall was laid on one side of the proposed Thompson dam, and a sufficient amount of fill made to flow the area of the Thompson Pond to facilitate the removal of all trees and brush, preparatory to raising the dam and deepening the pond.

Welsh-Sullivan Unit.—An area of 27.47 acres was leased from David J., Mary R., Kate E., and Elizabeth B. Welsh, and 12 acres adjoining from Grace E. Sullivan, which will permit of the construction of a dam placing 20 acres under water. The leases covering these properties are also for five-year periods and with an option of purchase at fixed prices stated in the leases. Surveys of the several parcels making up this tract were also made.

AYER GAME FARM

Each year's developments bring us nearer to the operation of this station as a game farm throughout the entire year. Originally we maintained there a stock of adult birds from which eggs were shipped to individuals and clubs for hatching—in line with our desire to send out to the public as good quality eggs as are used at our own game farms. This year, for the first time, the farm was operated throughout the entire year. After the egg-stock was distributed there was much work done growing crops, moving the pens on to new ground, and preparing for the next crop of young birds to be reared through the winter for the 1928 egg-stock. Additional fruit trees and grape vines were planted, particularly around the edges of the large swamp, which eventually will make a splendid area within which to carry birds through the winter. Good crops of corn, oats and clover were harvested, to be part of the coming winter's food supply. Out-door hoppers for the handling of scratch grain and mash were constructed along special designs, that proved very satisfactory.

A temporary dam was placed on the never-failing brook which runs through the property, which flowed a pond of five acres. This pond, when completed, will be a fine addition to the farm, not only for the growth of pond fish, such as pickerel and horned pout, but as a part of a sanctuary for wild fowl.

A survey of the farm was completed and permanent markers set up. 1400 trees were planted.

Pheasants.—There were 426 adults on hand December 1, to which were added two re-captured escapes and 3 adults from the East Sandwich Bird Farm. Of these 23 were distributed prior to the laying season and 10 were lost, leaving 398 on hand at the beginning of the laying season.

From this egg stock were collected 15,049 eggs, of which 13,444 were sent to clubs and individuals for hatching. 590 were sent out of the State, 12 to the Peabody Museum, and 343 used for feeding the young pheasants. 660 were set in incubators in experimental work, from which 6 birds survived.

To the 398 egg-stock on hand at the beginning of the laying season were added 13 imported birds from the Wilbraham Game Farm. 292 were distributed to clubs and individuals, 79 were lost, and 40 remain on hand November 30.

In order to relieve crowded conditions at the East Sandwich Game Farm 504 young pheasants were received at the Ayer Station for later distribution. From the same station there were received 200 for the 1928 egg stock, and from the Wilbraham Game Farm 199 for the egg stock. 40 of these birds were sent out to be wintered and 217 were lost. The remaining 646 (plus the six from the experimental work), give 652 on hand November 30.

East Sandwich Bird Farm

Pens adjoining the new brooder house were built and this unit was operated to capacity for the first time.

A substantial part of the period which is ordinarily devoted to new construction was used to trap up the brood stock of quail with which the breeding of such birds was resumed in the spring.

The old breeding pens for quail were revamped and used, although in a dilapidated condition. A new pen for the wintering of quail was constructed, 48 x 80 feet. The baseboards were carried higher than would be required for pheasants and much smaller wire used throughout. The pen is sub-divided into four separate sections, each 12 x 80 ft. The pen was built around and through a plantation of dwarf pine trees which will supply much natural cover. One of four concrete bases was put in upon which will be located wintering houses adjoining each section. All chimneys to the brooder houses were repaired. A small incubator for the handling of quail eggs was purchased. A stock of second-hand lumber from Carr Island was delivered on the ground for use in future pen construction.

The available territory for the breeding of game birds was greatly increased by the addition of the large tract adjoining the game farm (the Hoxie property, so-called), purchased by the Associated Committees for Wild Life Conservation which is more fully dealt with under Acknowledgments. The new quail pen was located on this ground.

A very serviceable two-room camp, previously located on the Boxford Reservation, was brought to the station and placed on a high piece of ground.

There were 2,000 trees received and set out, besides the 2300 received last fall and heeled in until spring.

Pheasants.—The 1,124 adult pheasants on hand December 1 were reduced by losses of 231, distribution of 340, and shipment of 3 to the Ayer Game Farm, to 550 at the beginning of the breeding season.

15,124 eggs were collected and set, and 8,723 young birds hatched. 4,911 of these were lost and 3,812 reared. Of these, 2,298 were sent to fish and game clubs and individuals for wintering, 430 distributed, 704 sent to the Ayer Game Farm (504 of them were for later distribution and 200 for 1928 egg stock), leaving 380 of the 1927-hatched stock on hand November 30.

Of the 550 adults on hand at the beginning of the breeding season 76 were lost and 293 distributed. To these were added 10 received from the Wilbraham Game Farm, so that 191 remain on hand November 30.

Quail.—During the winter 77 adult quail were trapped. This flock was reduced prior to the breeding season, by loss or escape of 7 and the distribution of 6 surplus cocks, to 64.

The work of the breeding season started with 32 evenly mated pairs. For several reasons they were not paired off and placed in their quarters until rather late in the season, with resulting delay in egg-laying which has a tendency to produce poorer results than otherwise.

374 eggs were collected and set.

Great variation was noted in the individual results. 11 pairs did not produce any eggs at all throughout the season, and the above 374 eggs were collected from the others, making the average about 18 eggs to each laying hen. Some few eggs, besides those collected, were destroyed by chipmunks.

It was planned to set most of the eggs under bantams, but the latter held off from setting, with the result that many of the quail eggs became too old for good results. Eventually about three-quarters of the eggs were placed in the small incubator which had been intended for use only for experimental purposes; but because of the age of the eggs, poor hatching resulted. One lot of 30 came off at one time and the chicks were placed in an apartment in the hot-water brooder house used for young pheasants. 16 of this lot were reared to maturity. Other lots were hatched and given to bantams later, with varying results.

Out of the 374 eggs there was a total hatch of 98 young quail, of which 59 were lost and 39 remain on hand November 30.

The same characteristics were noticed in work with the wild trapped birds as had been observed in the work with quail in former years, namely, the tendency to start late in laying; the non-producing females; and the relatively smaller number of eggs laid per hen.

Of the 64 adults on hand at the beginning of the breeding season 12 were lost and 52 remain on hand November 30.

Marshfield Bird Farm

Considerable time of the superintendent was occupied, during the early winter, in constructing the necessary pens and assembling the equipment to house our exhibit at the New England Sportsmen's Show held in Boston in January.

A large brailling yard, to include 9 acres of swamp and upland, was constructed. The fence is 9 feet high, the lower part made of boards and wire sunk into the ground. A two-foot wire around on top has been added. One section of the yard was wired off to carry the brood stock through the winter, and shelters constructed. Within this enclosure a large catching pen was built, to facilitate the handling of young stock which will be reared in the large yard during the summer and fall.

The small camp previously used in the smelt work on Weir River was set up and used this year to house a watchman who volunteered his services free of charge. This camp was set on a new foundation, reshingled, finished inside with beaver board, equipped with stove, and otherwise made comfortable.

A new well was driven and equipped with pump, and repairs were made on the water system. The house formerly used for fancy pheasants was moved to a new base, and the framework for adjoining pens put into position to use for the breeding of ring-neck pheasants. A substantial amount of grading and filling was done around these pens.

The roof of the small brooder house was re-shingled. Additional drainage tile was placed.

About half the 2,000 trees received from the Forestry Division and heeled in during 1926, were set out during the year, the remainder being held to plant later on new land now being built.

Pheasants.—The year opened with 1,424 adult pheasants on hand, to which were added 133 imported from England. 216 of these were distributed in December, 1926, to clubs and individuals for wintering, 635 were distributed for liberation, 10 distributed outside the State, and 122

lost or unaccounted for, leaving 574 on hand at the beginning of the breeding season.

14,924 eggs were collected and set in incubators, and 6,767 young birds hatched. About the middle of May an epidemic of some unknown disease attacked the young birds, and about this same time it was observed that the brood stock appeared to be sluggish and inactive. The young birds died off in large numbers from the first to the tenth day after hatching. Every precaution was taken to prevent this heavy mortality, but without results. Independent scientists, all authorities on bird culture, were consulted on the problem of this disease, and they either personally visited the farm, made observations on live specimens sent to them, or autopsied dead specimens. The reports of their findings varied to such an extent, that it was impossible to arrive at a definite conclusion as to the true cause of death. It was finally decided and agreed, however, that it would be safe to liberate the entire brood stock in October or as soon as possible thereafter, in addition to all the young stock which had escaped the disease and been reared. It appeared advisable to liberate all of these birds in wild country, at a distance from farms and poultry plants. The losses from this epidemic among the young birds totalled 6,366, and only 401 were reared. 9 of those were sent away for scientific examination, 312 were distributed, and 80 remain on hand November 30.

There were 574 adults on hand at the beginning of the breeding season. Of these 482 were distributed for liberation, 50 died as a result of the epidemic, and 42 were sent away for pathological examination. In the early fall 416 adult pheasants were received from a commercial dealer, to be used as new brood stock at the farm next spring. Five of these died, leaving 411 on hand November 30.

As a precaution against a reappearance of the disease, the 84 brood pens from the orchard were taken down, sterilized thoroughly, rebuilt, and painted, ready to be placed in a new location in the spring. The orchard was plowed, limed and harrowed. Some of the top soil of the pens was taken off to the depth of a shovel blade, as recommended, and the dirt carried out and dumped to use for filling near the land of the railroad company. All the gardens were cleaned up and plowed ready for spring work.

Sutton Hatchery

For report of pheasants carried over from last year, see end of Sutton Fish Hatchery report.

Wilbraham Game Farm

A new roof was placed on the cottage located at the Reader tract, a new porch built and the inside of the house painted and papered. A new roof was put on the barn adjacent to this house, the adjoining shed torn down, and all out-buildings painted—all of which greatly improved the appearance of the place. Repairs were made in the superintendent's house. The upper tenement was re-wired and a separate meter installed, and toilet put in. The floor of the stalls in the barn was lined with copper sheeting and an iron trough attached to drain the stalls out through the side of the barn into a cess pool, in order to keep clean the entire basement of the barn, part of which is used as an incubator cellar and part for general storage.

Additional shrubbery and ornamental trees were planted, and 1000 trees set out.

Pheasants.—The 820 adult pheasants on hand December 1 were increased by 141 purchased birds from England. 318 were distributed to clubs and individuals, 64 were lost, 13 sent to the Ayer Game Farm, 10 to the East Sandwich Bird Farm, leaving 556 on hand at the beginning of the breeding season.

20,826 eggs were collected, of which 20,667 were set in incubators and 10,118 young birds hatched, of which 1,554 were reared. 200 (one of

which was lost in transit) were sent to the Ayer Game Farm for 1928 egg-stock, 1,085 sent out to be wintered, 8 were liberated and 38 stolen from the pens, leaving 223 on hand November 30.

Of the 556 on hand at the beginning of the breeding season 308 were liberated, 51 lost or unaccounted for, and 197 remain on hand November 30.

FISH AND GAME DISTRIBUTION

FISH DISTRIBUTION

The problem still remains of an adequate fish distribution system. At present the distribution of the output from the hatcheries is accomplished, in most cases, by shipment by rail to a designated railroad station, where the fish are turned over to the distribution committee of a local club, or to some individual. A considerable number of fish are also taken out by hatchery trucks, and trucks provided by the sportsmen's associations. The shipments via our own trucks are planted by, or under the direction of, one of our employees in the presence of the applicant or his representative; but in the rail shipments we are unable to superintend the actual planting in the waters, owing to the large number of shipments in a given year, and the necessity of our wardens being on other work. We again stress the need of a sufficient number of fish messengers and fast-going, rugged trucks to enable us to transport all fish from the hatcheries and plant them. While each receiving agent is handed a poster containing full instructions for caring for and planting the fish, we believe that many shipments are still handled unsatisfactorily.

The total expenditure for fish distribution was \$3887.65. Tables showing details of the distributions appear at the end of the section, to which reference is made to supplement the following reports on the individual species.

Brook Trout.—Our present policy is to plant only fish large enough to be legally caught; but, when crowded conditions in the trays or pools necessitate thinning out the stock to insure sufficient growing room, the discarded stock is distributed as a by-product. In this way there were distributed to public waters, 47,000 eyed eggs which were planted in feeder brooks, 432,000 fry and 267,980 fingerlings. In addition, 170,000 fingerlings were sent to the rearing stations of certain clubs for growing to larger size and subsequent distribution, and 336,623 were held at all the stations to be grown to yearlings for spring distribution. The total distribution of yearlings was 235,603 and of adults, 3,882 with 3,533, yearlings and 1,893 adults on hand at the stations at the close of the period of this report.

The experiment in stocking certain ponds (landlocked, or with screened outlets) with large trout, was continued and stock placed in the following ponds: Onota Lake, Pittsfield; Congamond Lakes, Southwick; Baptist Pond, Chelmsford; Lake Archer, Wrentham; Lake Attitash, Amesbury. Further stockings will be made as suitable fish become available.

Brown and Loch Leven Trout.—Our distribution of brown and Loch Leven trout was confined to specially selected waters which have been found, after careful investigation, to be suitable for this species. The year closes with 14,000 fingerlings, 200 yearlings and 1,333 adult brown trout and Loch Leven trout on hand.

Rainbow Trout.—Last year the entire production of rainbow trout fingerlings was retained for work at the station. During this year there were 4,420 of these distributed as yearlings in specially selected waters. Of the present year's production there remain 14,000 fingerlings on hand and 40 yearlings.

Chinook Salmon.—The Chinook salmon raised at the East Sandwich Hatchery were disposed of by plants of 12,000 in Peters Pond, Sandwich, Ashmet Pond, Falmouth and Mashpee, and Bloody Pond, Plymouth,

allotment of 30,000 to the Dighton Fish and Game Club rearing station for further rearing and distribution, and 4,902 remain on hand.

White Perch.—The adult white perch salvaged from Tashmoo Pond were used this year exclusively for stocking the ponds under 20 acres and other private waters, the owners of which had agreed to permit the public to fish therein for a period of years, in order to bring them within the requirement of the license law (see Ponds.)

Work of the Salvage Unit.—While we were able to handle several salvage jobs over and above the work of any previous year, we repeat—that this work is only in its infancy. It consists in using an outfit of stationary traps to catch up fish in water supplies closed to public fishing, and liberating them in open water. The work was greatly facilitated this year by the addition of a new one-ton White truck for carrying the gear from point to point, and for transporting heavy loads of fish. The fish trapped are adults. They are carried in 40-gallon cans, and, because of their size and the time of year collected, they can be transported only short distances. Therefore in salvage work only waters near the scene of operations can be stocked. We should have at least five such salvage crews to work each year, starting when the ice goes out in the spring and continuing until warm weather and the pond vegetation stop the work. Activities would be resumed in the fall and continue until freeze-up time. The salvage system and the pond-cultural units offer the only attractive methods of providing a suitable stock of pond fish. The main salvage jobs were carried on at Tashmoo Pond on Martha's Vineyard; Wenham Lake, Wenham; General Butler Ames Pond, Tewksbury; and Long Pond, Falmouth.

Most of these salvage jobs in the future will be in the municipal water supplies. In order that the public health should be properly safeguarded (in past jobs) each member of the salvage crew was cultured by the State Department of Health and certified as a non-typhoid carrier. They were instructed to observe (and did observe) the following sanitary precautions as outlined by the Department of Health—

To keep as far as possible from the "intakes" (that is, the points through which the water is distributed to the consumers); to see that the traps and other gear which come in contact with the water are handled only by those men who have been certified by the Department of Health; to set out traps to dry only on ground which is entirely free from pollution; to observe the strictest sanitary precautions in their personal habits, both on the watershed and in the water itself; to permit no fishing in the pond; and to rigidly exclude all persons from the locations on the watershed where the gear, trucks, cans, etc. are handled.

Salvage operations started in Tashmoo Pond, Martha's Vineyard, and continued there from March 26 to May 2. 80,250 adult white perch were collected and distributed.

In May the gear was transferred to Long Pond, Falmouth (a water supply closed to public fishing) for salvage work by request of the town officials, who paid all expenses as was done last year. The salvage crew collected 1,200 adult small-mouth black bass, 2,000 adult yellow perch, 250 adult horned pout, and 50 adult white perch. These were distributed in ponds in Falmouth open to public fishing.

From June 22 to 25 the work was continued in Wenham Lake, the expense being defrayed by funds raised by the North Shore Rod and Gun Club (see Acknowledgments). There were collected, 2,920 adult white perch, 549 small-mouth black bass adults and 184 pickerel adults, which were planted in local waters open to public fishing.

From June 3 to 10 the work was carried on at the General Butler Ames Pond in Tewksbury, from which there were taken 1,830 small mouth black bass adults, 3,910 calico bass adults, 350 horned pout adults, 1,160 blue gill adults, all of which were distributed to public waters. The

salvage crew also collected 50 small-mouth black bass adults and transferred them to the small pond of General Butler Ames.

Several small salvage jobs were accomplished, and the fish planted, for the most part, locally:

By wardens: from Meeting House Pond, Westminster, 258 small mouth black bass adults; from City Farm Pond, Fitchburg, 1,000 horned pout fingerlings; from Prospect Pond, Taunton, 300 adult white perch.

By John H. Tarment of the Foxboro Fish and Game Association, from the private pond of E. H. Bristol of Foxboro, 3,750 horned pout yearlings, 1,489 horned pout adults, 950 pickerel yearlings, and 83 pickerel adults. In exchange for the fish taken last year from this pond there were 600 yearling brook trout given from the Sandwich Fish Hatchery.

Under authorization from this Division eight members of the Fall River Rod and Gun Club took, with hook and line, 2,152 adult small mouth bass, 6 pickerel adults and 10 white perch adults from North Watuppa Pond (a water supply) and planted them in South Watuppa Pond (which is open to fishing).

Under authorization from this Division the Holyoke Fish and Game Club seined from the Holyoke Cove and the South Hadley Cove of the Connecticut River, 18 yellow perch adults, 1 bass fingerling, 18 pickerel yearlings and 8 horned pout fingerlings, and planted them in the Hampton Ponds in Southampton and Westfield.

Small-mouth Black Bass.—The small-mouth black bass distribution was conducted on the plan of last year—that is, planting in a few specially selected waters rather than an indiscriminate distribution. Following are the ponds which received stock: Windsor Pond, Windsor; Richmond Pond, Richmond and Pittsfield; Lake Buel, New Marlboro; Lake Rudd, Becket; Lake Attitash, Amesbury; North Pond, Orange; Leverett Pond, Leverett; Congamond Lakes, Southwick; Lake George, Wales; Water-shop Pond, Springfield; Forest Lake, Palmer; Goshen Reservoir, Goshen; North Pond, Hopkinton; College Pond, Carver; Boot Pond, Plymouth; West Pond, Plymouth; Webster Lake, Webster; Little Pond, Bolton; and Long Pond, West Rutland.

Muskallunge.—In May there were received from the State of New York, as a gift, 25,000 muskallunge fry in the yolk-sac stage, in excellent condition. These fry were planted in the Connecticut River at Turners Falls, by scattering them thinly in the weedy beds in six to eight feet of water, over the best breeding grounds in Barton's Cove.

Horned Pout, Blue Gills, Pickerel and Yellow Perch.—As usual the stock distributed consisted of the product of the Stockwell Ponds, the Palmer Hatchery, and various salvage jobs.

Alewife.—The following depleted breeding grounds were stocked with adult alewives, collected in streams where they were running in good numbers: Monponsett Lake, Halifax, 450 in the west lake and 345 in the east lake; Nippinicket Pond, Bridgewater, 670; Town River, West Bridgewater (just above the Stanley Iron Works fishway) 130; Robbins Pond, East Bridgewater, 499. Total, 2,094.

Miscellaneous Distributions.—At the close of the New England Sportsmen's Show the following exhibitors turned over to us for disposal, the stock which had been on exhibition. This was planted in waters near Boston. From the State of Vermont, 100 brown trout fingerlings (3 in.); 11 brown trout yearlings; 9 brown trout adults; 9 landlocked salmon adults (8 to 9 in.); 16 lake trout fingerlings (3 in.); 15 lake trout yearlings (8 in.); 16 brook trout yearlings (7 in.); 7 brook trout adults (8-10 in.); 25 lake trout fingerlings (3 in.) From the U. S. Bureau of Fisheries, the State of New Hampshire and the State of Maine, 60 brook trout yearlings (5-9 in.).

	Product of State Hatcheries	Not Hatch- ery Product (seining, gift, purchase, etc.)
Brook Trout:		
Eggs ¹	— ¹	—
Fry ²	— ²	—
Fingerlings	267,980	—
Yearlings (under 6 inches)	27,638	—
Yearlings (over 6 inches)	207,889	76
Adults	3,875	7
Brown Trout and Loch Leven Trout:		
Fingerlings	15,560	100
Yearlings	7,500	11
Adults	345	9
Rainbow Trout:		
Yearlings	4,420	—
Chinook Salmon:		
Fingerlings	12,000	—
• Small-mouth Black Bass:		
Fry	165,000	—
Fingerlings	21,475	—
Yearlings	—	—
Adults	9	3,837
Horned Pout:		
Fingerlings	8,220	1,000
Yearlings	1,500	3,750
Yearlings and adults mixed	97,965	—
Adults	—	2,089
Yellow Perch:		
Fingerlings	6,100	—
Yearlings and adults, mixed	940	2,000
White perch:		
Adults	—	83,520
Blue Gills:		
Fingerlings	93,700	—
Yearlings	2,605	—
Adults	219	1,160
Pickrel:		
Fingerlings	1,100	—
Yearlings	—	950
Adults	1,956	267
Wall-eyed Pike Perch:		
Fry	490,000	—
Calico Bass:		
Adults	—	3,910
Sunfish:		
Adults	75	—
Alewives:		
Adult	—	2,094
Miscellaneous Species:		
Lake trout fingerlings	—	41
Lake trout yearlings	—	15
Landlocked salmon adults	—	9
Muskallunge fry	—	25,000
	1,438,071	129,845

¹ 15,000 eggs were planted in brooks to hatch, and 42,000 others planted after exhibition at the Sportsmen's Show.

² 432,000 fry were distributed as a by-product.

Fish Distributed to Clubs for Rearing to Larger Size Before Liberation

Trout fingerlings (1½ to 2 inches):	
Peabody Fish and Game Association	30,000
Canton Fish and Game Association	25,000
Worcester County Fish and Game Association	60,000
Wrentham Fish and Game Club	25,000
Chinook Salmon Fingerlings:	
Dighton Fish and Game Club	30,000
	<hr/> 170,000

GAME DISTRIBUTION

Pheasants.—For a number of years we have distributed pheasant eggs to individuals and clubs for hatching. Likewise we have stocked, with small fish, the several small rearing stations operated by clubs for the purpose of rearing the fish to larger size before liberation. This was pioneer work in educating the sportsmen and fishermen to help themselves. As a result, the requests for pheasant eggs have continued to increase, year after year, to the point where this year we could not supply the demand, although there were 13,444 eggs shipped out. From these there were hatched 5,916 pheasants, of which 2,545 reached the age for liberation (of these 238 were carried through the winter).

Three years ago we inaugurated the policy of asking individuals and clubs to carry the annual output of young birds produced at the game farms, through the fall and winter to be liberated in the spring as adult birds. From a very small beginning this work has so enlarged that this year practically the entire output of our game farms is now thus housed and being carried through the coming winter, without expense to the State. The superintendents of our game farms are unanimous in the opinion that better results will come from liberating these birds in the spring, shortly prior to the breeding season, than to let them go in the late summer and fall at the age of ten or twelve weeks.

While it is a question whether the maximum results are received from the eggs and young fish sent out, we believe that the educational returns are so great that we are proceeding slowly in abandoning any portion of the work.

We have continued to band all adult pheasants liberated from the game farms, keeping rather elaborate records. We are slowly building up returns that may, upon analysis, throw some interesting light on the extent to which these birds travel.

The total number of pheasants distributed was 750 young and 2,869 adults, with 3,423 being wintered as above described, and 1,335 young and 839 adults on hand at the State game farms.

White Hares.—As usual, white hares were imported from Maine and liberated. But again we were disappointed in the extent to which our orders were filled. So much depends on weather conditions that the shippers cannot make any guarantee as to delivery. The distribution period extended from December 27, 1926 until March 28, 1927. Only 1,186 hares were received (of which 326 were imported after the season closed). One or two of the clubs put their quotas in pens and carried them quite successfully, liberating them after the shooting season had closed. From the colony on Penikese Island 24 white hares were distributed. Experiments in the breeding of white hares in semi-captivity, and the discovery of methods by which they can be trapped and carried in captivity for periods of two or three months, offer an interesting field for experiment.

Cottontail Rabbits.—The only cottontails distributed were the 240 trapped on Penikese Island.

The cost of game distribution was \$1,210.74.

Game Distributed to the Covers, 1927

	Product of State Hatcheries	Not Hatchery Product (Pur- chase, gift, etc.)
Quail:		
Adult	6	—
Pheasants:		
Eggs ¹	— ¹	—
Young	750	—
Adult	2,869	—
Cottontail Rabbits:		
Adult	240	—
White Hares:		
Adult	24	1,186
	<u>3,889</u>	<u>1,186</u>

¹ 13,444 pheasant eggs were distributed for hatching and subsequent distribution.

*Pheasants Distributed to Clubs and Individuals to be Reared to Adults
for Spring Liberation*

Adults (1926 hatch) carried through the winter of 1926-7 by 2 clubs and 2 individuals	216
Young (1927 hatch) to be carried through the winter of 1927-8 by 55 clubs and 4 individuals	3,423

MARINE FISHERIES

GENERAL

It is a great satisfaction to record an increased interest on the part of the government and the public at large, in the commercial fisheries. As one of our oldest industries we have been very slow to appreciate the size of this industry and its importance to our every-day life. Its output is invaluable in maintaining a balanced ration in the feeding of our people. The developments within the industry that have taken place during the past two or three years in the direction of putting a better commodity on the market, can be highly praised. The sanitary conditions under which fish are handled from the fishing grounds to the consumers' tables excel those of any other period in the history of the industry and are such as should command the confidence of the public. Both the consumers and the industry appreciate the inspection of fish as it is now carried on in our State. It not only is of benefit to the former, as bearing on the quality of the fish sold, but to the latter as bearing on the increased consumption of fish which is bound to take place as the public more fully understands the situation.

It was only a short time ago that the industry was in the throes of a period of depression. It is rapidly emerging into a more commanding position than ever before, due to the teamwork of the scientists, the financier, the wholesaler and the retailer, the skippers and the rank and file of the men who handle the gear.

If all of this splendid progress is recognized by the government with a substantial appropriation that this Division can continue to be of increasing assistance in forwarding this general development, we will see the rehabilitation of an industry, which, from the nature of it, will be a truly Massachusetts institution.

INSPECTION OF FISH

This office has been endeavoring to encourage the fish producers and dealers throughout the State to place the quality of their goods on such a high plane that criticism would be impossible. That was the mark aimed at, and at the same time it was realized that absolute perfection could not be obtained, that the elements of human nature and business, delays and the incentive of some to hold on and sell where possibly fish should have been thrown away, and thus save a loss, were almost inherent. But the grip on the upward rounds of the ladder of good fish is steadily growing stronger and today it is only fair to assert that never before has the fish eating public of the Commonwealth been so well served with quality fish as now.

In this connection it is interesting to have the truth of the above statements brought out strongly by others than ourselves, and for that reason we may be pardoned if we quote from the annual resumé of fisheries operations at the Boston Fish Pier by Fred F. Dimick, Secretary of the Boston Fish Bureau, than whom probably no keener observer or higher authority on matters of this sort is to be found in Massachusetts. Mr. Dimick says:

"It is worthy of note that more interest is shown in placing fish of fine quality on the market. Steamers and vessels have in some instances landed handpicked haddock, that is haddock on which the pitch fork is not used in handling them. Some vessels have taken aboard boxes in which the fish are packed, and placed in the hold of the vessel. The inspection law on fish which has been in force a number of years has had an influence to improve the quality of the fish placed on the market."

Coming from such a high authority and unsolicited, certainly it must be taken at its face value.

There are indications on every hand of the efforts of individual concerns to make quality shine above price as their guiding star to increased trade, and it really can be said in this regard that the quality idea is steadily but quietly growing. The fish inspection work is still in its infancy. It has made a good start. It can do more and better work as it goes on with an added force of deputies which is considered necessary. In the annual order of appropriations for 1927 there was made provision for one new deputy. On July 15, 1927, Capt. Jerry E. Cook of Gloucester was given the provisional appointment, the idea being for Captain Cook to have headquarters at Gloucester and during seven months in the year to handle the large fresh fish fares designed for splitting and salting and which weigh anywhere from 100 to 225 thousand pounds each. To assure the quality of trips of this sort requires expert knowledge of the fisheries. Hence the appointment of Captain Cook.

The work of inspection at the Boston Fish Pier, at the Atlantic Avenue concerns in Boston and at the retail stores throughout the State, also the cold storages and freezers has been carried along in accord with the same schedule that has worked out well in former years, to the end that where it was found necessary places were visited at least three times annually and sometimes more frequently, while other places were inspected at least twice a year. It might be said here with all due force that the number of inspections in the markets of the State are limited by the appropriation set aside for the work of the office of the Inspector of Fish, and it might be well to suggest that the amount given should at least keep pace with the increases in salaries because it is sometimes embarrassing to have to hold men, who are eager to work, in the office because of the fear of exceeding the expense appropriation.

It is recognized on all sides that the fish business is gradually changing. It is known also that Massachusetts is the premier fishing state and that fish inspection has come to be a standard practice within the confines of the Commonwealth and on the fish sent out by her dealers. For two years leading fish dealers have represented that the Commonwealth could best

aid this oldest industry of the State by expanding the work of fish inspection. This they have unreservedly said at the State House. It is admitted that some changes could possibly be made in the present fish inspection law which would, while giving it no more power than necessary, fit into the present scheme of things a little more effectively. It has also been suggested by many of the fish dealers that the fish inspection work be expanded to include not only fresh and frozen fish and cold storage fish as at present, but salted and pickled and cured fish; in fact, to evolve a fish inspection act to the end that all fish landed or brought into Massachusetts ports from whatever source, and all fish shipped from Massachusetts ports to whatever destination, might in the final analysis bear the magic term "Massachusetts Inspected." Given this, then, the future of the Massachusetts fisheries and the Massachusetts fish industry could well be called secure.

The following table shows the work accomplished during the year 1927.

- Inspections in retail stores, 3,157.
- Inspections in wholesale stores, 16,334.
- Freezer inspections, 317.
- Inspection of pedlar's carts, 540.
- Inspection at Yarmouth, N. S. steamer, 235.
- Vessel inspections at Gloucester, 403.
- Vessel inspections at outlying ports, 50.
- General inspection trips, 8.
- Fish condemned at Boston Fish Pier from vessels, 15,869 pounds.
- Fish condemned at Gloucester direct from vessels, 15,000 pounds groundfish; 2,000 pounds swordfish.
- Fish condemned at retail stores, 2,570 pounds.
- Condemned at Fish Pier from consignments on Yarmouth, N. S. steamer; graded as "jellied" 33 fish; 11,036 pounds.
- Condemned, landed at Boston from Canada by rail and steamer, 1,176 pounds.
- Condemned, landed at Boston Fish Pier arrived by rail, 6,035 pounds.
- Condemned, landed at Boston Fish Pier graded as "jellied," 59 fish; 14,869 pounds.
- Total condemned at Boston Fish Pier, and at Boston from Canada by rail and steamer, 35,586 pounds.
- Total inspections, 20,638.
- Total fish condemned, 104,141 pounds.
- Total court cases, 19.
- Total convictions, 18.

THE DEEP SEA FISHERIES

The off-shore fisheries as pursued by vessels from the ports of Massachusetts, and in which line this State is unexcelled both in size of fleet and total catch apparently in the western hemisphere, brought to market during the year 1927 a record catch. When it is recalled that the vessels hailing from Massachusetts towns and cities along the coast land their catches from Cape May to Portland, the scope of their activities is but mildly stated, for it must be understood that in order to market at these two extremes, they pursue their vocation from Cape Hatteras on the south to the straits of Belle Isle, contiguous to the Labrador coast on the north.

The greatest increase is noticeable in the landing of groundfish and in this respect it is to be noted that the Boston Fish Pier, the greatest fish landing place in all America, exceeded its previous high record.

One could go on, if space permitted, in regard to fisheries catches and landings, but sufficient to say here that the year cannot be put down otherwise than successful to fishers, buyers, and sellers. It really was a good fish year. The winter haddocking fleet, centering at Boston, pro-

duced a record catch, and strangely enough, when fish were most plentiful some very satisfactory prices were realized, which was due to the great increase in the demand for fish fillets, that is the sides of haddock and codfish daintily cut off in one delicious slice and sent to the consumer carefully iced and ready for the frying pan.

The operations of the fleet, following closely the lines of the previous year, found December a very hard month in which to fish owing to very bad weather and throughout the season was punctuated with flurries of weather, that were anything but fit for fishing. Owing to the early striking in of the schools of fish on Georges some large catches were made sooner than anticipated, with the result that the smokers, cannery and splitters were able to secure an early supply and still the fresh fish market was supplied at good prices. The week ending March 17 made the record for all time, when 7,084,100 pounds were landed. Indeed in this connection it is doubtful if any four or five consecutive weeks around this date, as far as totals of fish landings are concerned, were ever equalled in the history of the fisheries, the total for 4 weeks being in the neighborhood of 24,631,383 pounds. Prices during the Lenten season were fair and indeed at the end were very good indeed.

With reference to the summer fresh fishing fleet, it can be said that more fish than usual were landed at the Boston market. The usual overplus went to Gloucester for splitting and canning, while many crafts with capacity fares went direct to the Gloucester market. The vessels that fish to bring home so-called "splitting trips" landed far less than the previous year. These crafts operated mainly on "Middle Ground," in the vicinity of Sable Island and on Western Bank. They found fish scarce in the early part of the season, but after July 15 they seemed to strike upon the school fish and from that time until fall the fares landed were of satisfactory quantity.

The fresh halibut fleet, composed of about the same number of vessels as last year, enjoyed a most successful season both as to catch and prices. The increase in catch was most gratifying, the total landings being 4,653,950 pounds, which showed a gratifying increase over 1925 and compares favorably with 1924 when 4,638,672 pounds were landed. Prices of halibut averaged higher this year than any year in the history of the industry and it is noticeable that a greater amount of the total catch was taken in the vicinity of Quero Bank, one of the most famous old-time fishing banks of record. A salient point in regard to the halibut fishery of this year is that several very large trips were taken from the shoal water of Green Bank and St. Pierre Bank and also on what is known as "The Funks," a definite ridge off the eastern side of Newfoundland. For the first time in many years also, several trips were caught in very, very shoal water, sometimes the trawls being set in seven or eight feet off the island of Anticosti in the Gulf of St. Lawrence.

The gill netting fleet had a year that would compare favorably with 1926 and in some spots, being favored with high prices, was one of satisfaction. The fleet, as far as Gloucester is concerned, comprised about 16 boats. Pollock during the fall formed the principal catch while later on during the winter, codfish, etc. were taken, followed by the usual catches of haddock in the spring. So satisfactory were the returns from this fishery that some of the boats engaged in it throughout the year. During the fall season when pollock were schooling, boats were landing from 15 to 30 thousand pounds for one night's fishing. Beside the gill netting crafts that operated from Gloucester quite a number of small boats fitted with gill netting gear fished out of Swampscott. The report from here is that the season was fairly successful as far as catch was concerned, but because of unusually low prices the fishermen took off their nets and engaged in lobstering earlier than usual.

The swordfishery conducted by over 100 crafts from Massachusetts ports, besides many from Maine and Connecticut fishing places, had a

successful year. It is true that the catch by the Massachusetts crafts did not reach the record of 1926 by some 1,671 fish, but when it is recalled that the fleet was hampered by unusually stormy weather and fog it is safe to say that with average fishing conditions the year would have been a record breaker. As it was, however, 12,323 fish were landed at Massachusetts ports as against 13,994 last year. Also in this connection it might be well to state that the importation of swordfish from Nova Scotia, via Yarmouth steamer, which is the usual method, was quite discouraging, in fact probably not one-half as many as the previous year. It is doubtful if 1500 fish reached the Boston market from Nova Scotia and this would certainly be not over 50% of the landings of last year.

The first trip of the season was landed at Boston on the sch. Hazel Jackson, 52 fish, on Thursday, June 16, the fish selling to the wholesale dealers at 40 cents per pound, the same price as the first trips of last year, but it should be noted that this fare was fully a week in advance of the arrival of the initial trips of 1925. Following along, in the latter part of June, the arrivals were so light that even the opening price was exceeded and small fares landed reached 45 cents per pound, the fish running a little larger in size than last year at this time. Swordfish continued in light supply throughout July, the operations of the fleet being handicapped by fog and bad weather, so that at the last of July the landings were fully 50% less than last year, although the fleet was larger, and strange to say after the opening of the season the fish ran smaller than usual. Coming along with the warm weather in early August, fares began to be larger, and the fish also showed a disposition to run up to the westward and in reasonable proximity to Nantucket, Marthas Vineyard, Cox's Ledge and Block Island and the small boats, manned by two men generally and sometimes three, fared well in consequence.

From then on, swordfish were in better supply and were found showing freely on Brown's Bank and around South Shoal Lightship, the fish from the South Shoal being larger than the eastern fish. The apparent deficit of 50% in the earlier part of the season was made up to a figure nearly approaching last year's total before the season closed. By early September the crafts began to haul out of the fishery as they arrived and the season closed soon after. Swordfish continue to be in the luxury class.

Mackerel Fishery a Success

Following the record-breaking year of 1926 in the mackerel fishery, naturally hopes were high that even this wonderful record might be exceeded, and indeed for a time it seemed that this was to be the fact; and truly it would have been so had it not been for the unexplained disappearance of the fish during the latter part of the summer and throughout the fall on the home fishing grounds.

The season out south was opened by the unusually early get-away of the fleet. The crafts however were met by very bad weather on the southern fishing grounds, causing the fleet to remain inactive for days at a time and some of the crafts were almost put out of operation by loss of seines and boats and other fishing apparatus. However, with the natural instinct of fishermen to overcome apparently insurmountable difficulties, all troubles were met and by the middle of April the fleet was found actively engaged.

Seldom has it been recorded that a more unfavorable state of weather existed in southern waters for the taking of mackerel than this present spring, and yet the boats and the vessels, large and small, hung to it, deep bedded with the belief that the fish would surely come. And come they did and in almost unequalled volume, for beginning with April 19 when substantial trips were landed at Cape May by Gloucester vessels, there was scarcely a let-up in the taking of mackerel throughout the season.

As a matter of record it might be set down here that the first schools were taken 30 miles southeast of Chincoteague Island and that the fish

mostly weighed about 1½ pounds apiece. The first trips landed at Cape May were rushed by express freight to Fulton Market, New York City, where they sold for 30 to 33 cents per pound.

From thence on, the bad weather having apparently departed, the mackerel catchers met with such success that the New York market was fairly flooded and prices went to a level lower possibly than ever was known before. Nevertheless, the continual flood of trips made the season a very, very successful one. It might be noted in passing here that up to April 28, the southern catch of fresh mackerel had reached 24,265 barrels. From then on the catch jumped by leaps and bounds. Apparently, there was no limit to the number of fish and the great number of schools and the ability of the captains and the vessels to make their hauls. So much so was this true that while the fish were coming to the northward, up towards Barnegat and Fire Island, catches were really phenomenal. The mackerel schools then moved rapidly to the eastward and by the time usually set for vessels to go to the Cape Shore off Nova Scotia, there to pursue their usual late spring operations, it was found that so great was the body of fish so near to the home market that but three vessels went to the Cape Shore, a most unusual situation.

The catches of the fleet continued very large, many hauls being made off No Man's Land and Block Island, and Boston became the receiving point quite a while before the usual Cape Shore fares were looked for. It would be almost useless to try to trace the operations of the fleet from now on, but sufficient to say that but three trips of fresh mackerel were received from the Cape Shore, while the whole fleet was paying its attention to the larger schools nearer at home and also to note that up to date of June 10, the usual time of the arrival of the bulk of the Cape Shore fleet, the southern mackerel catch had amounted to 97,997 barrels, 40,000 barrels in excess of the previous year and without doubt the greatest southern mackerel catch on record.

From then on the fleet operated with success on the schools around Block Island and No Man's Land, South Shoal Lightship, South Channel and even on Georges. Following this there were good catches made in Boston Bay, on Middle Bank and some few catches in the vicinity of Portland Lightship. A feature of the mackerel fishery for the year was the appearance in large numbers of bulls-eye mackerel which showed up in large quantities off Block Island and the Vineyard Sound vicinity. These fish came in such numbers as to actually glut the market and shipments failed to pay for the cost of packing and transportation.

The season held out its promise of being a record-breaker for all time up to August 1st, when a sudden decline caused by foggy and rough weather put the "stopper" on the onward rush. From then however the catches held ahead of 1926 for the rest of the month, but when September came in the catch fell off and the 1926 record became again predominant.

While the total catch of mackerel did not equal that of 1926, which is now by common accord admitted to be the record, still the difference was not over large and the prices so much more generally sustained this year that it is safe to say the mackerel fishery of 1927 as far forth as financial returns are concerned, at least, equalled the record catch year of 1926.

While the mackerel seiners had one of their most successful seasons as noted above, the netting fleet as a whole did not share in the prosperity, for the reason that while their catches out south in the spring were large the prices were very low indeed and hardly paid for the loss of nets and the wear and tear upon the gear. During the present fall, however there was a little gleam of sunshine because the netters that fished out of Gloucester and extended their nets 30 and 40 miles off the coast, met with a fair amount of success and their catches not only found a ready market, but a splendid price therefor. At the time of this writing, November 30, the catches were continuing almost nightly. There was every indication that the fleet, if favored by ordinary weather, would continue its opera-

tions at least until Christmas. Some idea of the splendid success attending on this fall fishery can be gleaned from the notation that in one night's fishing the sch. John Cooney landed in Gloucester 12,500 pounds of mackerel taken within fifteen miles of Eastern Point whistling buoy.

The Massachusetts catches of fresh and salted mackerel from December 1, 1926 to November 30, 1927, inclusive, and for the corresponding period of the three previous years, were as follows:

	Dec. 1, 1926 to Nov. 30, 1927	Dec. 1, 1925 to Nov. 30, 1926	Dec. 1, 1924 to Nov. 30, 1925	Dec. 1, 1923 to Nov. 30, 1924
Salt Mackerel (Bbls.)	1,002	5,380	12,442	11,000
Fresh Mackerel (Bbls.)	252,962	304,385	203,961	101,954
Total	253,964	309,765	216,403	112,954

Cape Shore Catches of Mackerel for Seven Years

Year	Arrivals	Fresh Mackerel (Pounds)	Salt Mackerel (Barrels)
1927	3	155,000	3
1926	53	2,397,700	1,310
1925	34	1,545,000	1,075
1924	24	996,000	854
1923	31	1,240,680	211
1922	48	1,353,900	2,344
1921	29	2,160,000	3,003

Hope For Return of the Bluefish

One of the most heartening features of the whole fish year along the Massachusetts coast was the appearance and taking, in increased numbers, of bluefish of good size. This, coming at a time following a long period of years of practically non-appearance of these gamey and delectable fish, has given rise to the hope in the hearts of the fishermen, the sportsmen and the epicure that once more they may be found in goodly quantity along our shores.

During 1923-4-5-6 keen observers found that every little inlet or river running into Vineyard Sound abounded with small bluefish running about four to the pound. These fish would strike in about the first of August and stay until the first of October, giving much sport to the rod and reel fishermen.

During the summer and fall of 1927, that is, this present year, there were no small fish to amount to much except around Westport and Padanaram river which had about the same run as the four previous seasons. Then during August, quite a few medium and large bluefish were caught at Dead Neck beach at Osterville and around Succonessett Rips. These fish went about four pounds each, and once in a while some fortunate fisherman could catch one going as high as seven or eight pounds. The news of the appearance of these fish soon spread and the fishing was in a measure quite intense, some of the boat fishermen following the fish along the south side of Cape Cod as far east as Monomoy Rips, making fairly good catches every day that it was suitable to fish.

On the north side of the Cape also comes an encouraging report to the effect that off the so-called Dennis beach, which is about half way between Cape Cod canal and Provincetown, during the last week in September and the first week in October, there was a catch of almost 100 barrels along the above-named stretch. These fish were mixed in size, but regardless of that, each fish was fat, thick and solid-meated which showed that it had been on good feeding grounds all summer.

One thing also is very noticeable; when the fish were first taken off Succonessett about all showed signs of feeding on small porgies and sand eels, but the fish taken on the north side of the Cape were filled with "silver-sides," spurling and several had quite a few blackback flounders in their pokes.

Warren E. Burgess at Brewster reported, along with catch of other fish in his trap, the take of 15,666 pounds of bluefish and 3,386 pounds of striped bass; certainly a most encouraging and interesting report, for not in recent years has any such satisfying return been made by any trap on bluefish and striped bass. Cape fishermen, besides being much interested in this report, see in it much hope for the return of the bluefish and striped bass in something approaching the quantities of former years. Mr. Burgess himself says he has known nothing like this for fifteen years. He is very much interested in the bluefish problem and states in a letter to this office that the fish began to run about July 1st and weighed about $\frac{3}{4}$ of a pound each, and as they grow faster than any fish that he knows of, by the end of the season (about October 30) those taken weighed $2\frac{1}{2}$ pounds each. He states that each year he had hoped that the "blues" would come back in July weighing fully as much as when they departed in October, but that this has not been the case, for they seem to begin all over again and weigh about $\frac{3}{4}$ to a pound on arrival. He invites a solution of this marine riddle as to where do the bluefish go when they reach larger size, and why do not the larger fish return to these waters? This Division is equally interested with Mr. Burgess and would like to hear from anybody as to his opinion on the subject. Mr. Burgess also states he has noticed that in the small fish in July and August there are spawn, both yellow as well as white. The striped bass taken in his traps ran in all sizes from 3 to 20 pounds each and this species really does seem to be increasing from year to year, which certainly is good news.

In conversing with the fishermen of the Cape one gets the impression that from these splendid signs and catches they are looking forward confidently for a return of the bluefish. Naturally everybody will wish that their hope may be fulfilled.

Cape Cod Activities

Taken as a whole the fisheries of Cape Cod in 1927 can be at best considered no more than "fair." In some cases good prices made up for small catches, and while some sections would not range as high in value of catch and landings as others, still on the whole the term "fair" would seem to apply. For instance, ten men at Provincetown fishing a string of ten traps, shared about \$1100 for the season and certainly this is a fair amount, although admittedly not anywhere near a prosperous season. The weather after the traps were put down was good for trapping and thus but a very small amount of twine was lost because of storms. There was an exceptionally large run of herring in March and April, the trap catch at Provincetown alone being estimated in the vicinity of nearly 20,000 barrels. The whiting catch which came later in June and July and after, was not as large as hoped for, and in consequence it may be that the demand will exceed the supply before the winter is over. The catch of squid was below normal. It is noticeable that in spite of the large mackerel run just outside of Provincetown, in Boston Bay so-called and on Middle Bank, the traps took only a few barrels during the whole season, and this applies to the whole of Barnstable Bay. Indeed, no school mackerel were taken in the Bay throughout the season.

The spring netters did poorly and the lobster catch, as far as can be learned, was less than last season, but this was financially compensated for by better prices. What would apply to the traps at Provincetown can be said also of those at Truro, while those at Brewster and Barnstable are reported as not faring as well. At Provincetown the flounder

boats did well throughout the summer, but about all of them went direct to the Boston fish pier in order to save shipping expenses and thus made money.

The sea scallop fleet was small as most of the fleet, some of which were from Portland, Me., went to the southward and fished on the grounds off Cox's Ledge and landed their fares at New Bedford. It was a big year on herring for the traps at Provincetown, fair on squid, poor on mackerel, and very few horse mackerel were taken. A few small sized bluefish found their way in the traps in the spring, but there were no scup or sea bass taken. The mackerel netters at Provincetown did well in the spring fishing.

The preparation and shipping of frozen whiting as an article of food, which was mentioned briefly in last year's report, has turned out to be a remarkable success as far as can be learned. The whiting are frozen and then skinned and cleaned until there is nothing but the flesh of the fish left. They are then carefully culled into three sizes, inspected for any possible defects, and after this work is done they are carefully frozen and packed in cartons or in boxes in weights to suit the trade. This industry is carried on by the Atlantic Coast Fisheries Co. of New York, one of the largest fisheries concerns on the Atlantic coast, which has recently bought both the Cape Cod and Colonial freezers at Provincetown, and established whiting headquarters in the Colonial freezer, where on the fifth floor, a crew of some 30 to 40 men and women are actively engaged in this work of preparing the whiting for market. When it is said that the marketing of this delicate and tasty fish will be limited this winter only by the supply, it can be readily realized that a new branch of the fish business has come to the front and the product has been accepted heartily by the fish-eating public. As this was a poor season for whiting and the catch was below normal the Atlantic coast people were forced to buy whiting from other areas to supply the demands of their trade. This will show to what heights the demand for an appetizing and well-prepared fish will go.

During the latter part of the season some of the traps secured small hauls of "bulls-eye" mackerel or "hard heads" as they are known to many. As these fish were also taken in large quantities in traps to the southward there was little demand for them in New York, and consequently the price was low. The few of these mackerel taken in Boston Bay during the heavy glut were brought in here and salted. The flounder fleet which did well during the summer, did poorly at Hyannis during the previous fall, but returning to Provincetown had a good winter, and those that returned to Hyannis in the spring also did well. A fleet of about 20 crafts took up the fishing again at Hyannis this fall, about October 20, but met with indefinite success, the catches being not over large, while the fish taken ranged small, going in the vicinity of 150 fish to a barrel. This fleet returned to Provincetown before December 1st and took up operations again off on the usual ground in that vicinity.

The catch of whiting as compared with last year was about one-half, while the demand was very great. Squid taken in the traps amounted to but one-half the last year's catch, while the mackerel take was but one-third of 1926. As previously stated, the herring catch was the largest for many years. While the catch of the traps as a whole as compared with last year was somewhat less, still it could not be called a poor year. The freezers at Cape Cod, taken as a whole, had, as compared with last year, less stock on hand this fall excepting herring, of which the supply was good.

At Chatham, which can be considered as giving the fish report for the season on that side of the Cape, herring were very plentiful but prices were low. Squid were very scarce, ranging from 6 to 25 cents per pound and the catch about one-tenth of last year. Large mackerel were more plentiful than last year, but prices were lower, ranging from 3 to 20

cents. Butterfish ran large and there was a fair catch in some of the traps, but on a whole these fish were not as plentiful as other recent years, prices ranging from 16 to 28 cents and most of the season from 20 to 25 cents. Small bluefish showed a gratifying increase. These fish were more plentiful than for several years. Lobsters were not very plentiful. Scallops were taken in greater quantities than last year and the prices were much higher, the lowest price paid being \$2.50 per gallon and the highest \$5.50.

Nantucket Fisheries

The flounder fishery, which is the staple fishery of the Island, has not been as good this year as last; also the fleet engaged has not measured up to the figures of last year for the reason that quite a number of the large boats, whose skippers, finding prices for flounders at New York not to their liking, shifted over and went quahauging and some to scalloping. That both of these ventures must have proved financially satisfactory is evidenced by the fact that while now November is considered a good month for flounder marketing, many of these boats are still sticking to the quahaug and scallop game.

There was a very short season on flukes this summer and the fish were not plenty at any time. The lobster fishery was not as good as last year, although some boats did well for a short time, the reason for the decline being not so much the lack of crustaceans in the water as it was that there was a lot of rain and bad, blowy weather all through the summer. On the whole the season might be called about "fair." The quahaug fishery has been somewhat better than last year and more boats have been engaged. The price, however, may not have averaged up to the previous year, but yet the financial returns, taken as a whole, could not be called unsatisfactory. There were plenty of codfish this fall and the traps did better than for several years in the taking of these species. The cod handliners also did well. The mackerel catch in this vicinity was not heavy. A few fish kept showing up all through the season with the traps getting their full proportion, but no big hauls were noted.

The scallop season showed splendid fishing, the first month with high prices and high grade goods, but at the present writing there is an ominous diminution in the catch which bodes no good for the scallop situation in the waters of the Island. This is proven by the fact that some of the boats have already given up the fishery for the year. There was a good run of alewives this spring, but the price was very small and only enough were caught for local use and for lobster bait. Very few pollock were taken by the boats in these waters this spring.

One of the principal reasons for the falling off in the flounder fishery as regards the port of Nantucket is of course the fact that many of the larger boats have fallen into the habit, when they have a good catch, of going through direct to the New York market and there landing their fares, where a few years ago a great many of these catches were landed at Nantucket and shipped barreled, to the New York market. Some of the captains claim, notwithstanding the extra time consumed in running to Fulton dock and returning to the fishing grounds, that, considering the expenses of freight from Nantucket and the cost of barreling, etc., they are better off to go through direct with their fares. This naturally is a question which concerns only the fishermen themselves, and it would seem that there is, to say the least, a difference of opinion on the matter, more especially where the question of time occupied in going through to New York, and which might be well used on the fishing ground is concerned.

Buzzards Bay Fisheries

From all facts that can be gathered by this office it is safe to say that the fishing season in Buzzards Bay has been better than last year. Traps of the Biological Laboratory fared better and in the other traps which

are allowed by law in this region, fish of all kinds, except mackerel, have been more abundant than for a good many years. There are rumors that more fish traps will be set in the bay near the vicinity of Cuttyhunk. However, this latter statement is not exactly endorsed at the present time.

The marine fishery as a whole in Buzzards Bay, outside of the few traps allowed by law, is confined to handline fishing and lobster fishing, there being no seining allowed in this district. Conditions according to our deputy here, are normal as regards handline fishing, the fish taken being confined to tinker mackerel, tautog, scup, etc., and is mostly carried on for sport and with little commercial aspect.

Speaking of the district including Fall River, Westport, Somerset and Swansea, the marine fisheries here are very limited, in fact being confined to the town of Westport. About all the fish landed at Fall River came from the neighboring waters of Edgartown, and Seaconnet Point, the latter in the state of Rhode Island. The shore fisheries in this district amount to but little as most of the areas have been condemned owing to pollution. With regard to Westport in particular, which is practically the center of fisheries activities for the extreme western corner of Buzzards Bay and in touch with the Elizabeth Islands, it can be said that lobsters have been more plentiful this year than for the past ten years; but also however, more fishermen have been engaged.

Codfish have been much more plentiful in this section than ever before in recent years, and an encouraging feature of note is, that bluefish have shown a good increase over last year. Smelt have been caught in the Westport River and at South Dartmouth in fairly large quantities and the fish have been larger than at any previous recent season; in fact at Westport this is the first year for some time that any have been taken on hook and line. Salt water perch have also been very plentiful and the squeeteague have appeared in fair quantity, which is something that has not occurred along this coast for at least ten years. Striped bass were really plentiful. Quite a few of these fish were taken in the fish traps along the shore, as well as many by rod and reel and the fish ranged anywhere from five to thirty pounds, which certainly is a splendid showing. It is worthy of notice here, however, that the catch of tautog fell off in this locality and also that a much smaller catch of this delectable fish is reported all along the coast in this section, the total landings being much less than for quite a few years.

Despite the fact that Buzzards Bay at the present time is producing very little fish, speaking commercially, it is interesting to note that situated at points on this beautiful body of water are two of the important fishing ports of Massachusetts, New Bedford and Woods Hole. To these ports ply daily busy crafts that pursue their fishing operations off Block Island and Cox's Ledge, Marthas Vineyard, Nantucket and even "The Rips" and Georges, so that any story of the fisheries of the Commonwealth without mention of what is going on at these ports would be lacking in completeness.

At Woods Hole the landings of swordfish were a little better than the previous year, in fact 900 of these big fish really were landed and it is noticeable that it was only necessary to condemn only one fish as a "jelly." As a whole, in the opinion of the dealers there, the fishing on the grounds on which the vessels supplying this port operate was about the same as last year with the exception of the noticeable increase in the bluefish take. There were times in the season when the small boats did not operate, owing to the glutted market condition at Boston and New York which precluded their receiving prices which would have allowed them to even pay their expenses. Bulls-eye mackerel were in marked receipt, and although there were several times when it did not pay to ship them, yet on the average however, the prices were a little better than last year. Handlining for scup and bass was profitable and the catches showed an increase over last year. There was about the same amount of landings of

mackerel and flounders as the previous season, but haddock and squeteague were very scarce in this vicinity. More bluefish, however, were caught in the waters noted above than has been taken since the days when the bluefish practically deserted Buzzards Bay. Not as many butterfish were brought to port as the previous season and practically no menhaden were taken in these waters.

At New Bedford 1437 swordfish were landed by the boats as against 800 the previous year, which is indeed a very gratifying showing and indicates that during the warmest part of the summer season quite a body of these fish were well up to the westward. Naturally this was very encouraging to the shore fishermen, as they received splendid prices,—prices probably never before equalled on an average. Ten fish were found to be jellied and were condemned. The New Bedford opinion as to the fishery in Buzzards Bay is, that it was even worse than last year, both for traps and handline, while the scallop situation was such as to be devoid of any encouragement at all, the New Bedford dealers being obliged to buy a lot of their fish from Boston and other ports to supply their demand.

Marthas Vineyard

Taken as a whole the Marthas Vineyard fisheries for the year can be recorded as successful. There was a fair run of codfish all winter, the fish running largely to "steakers," so that the trawlers fared very well. After the spring fish struck, however, the handliners had only a fair season as the fish were small and market prices low. Pollock struck fully a month earlier than common on the fishing grounds in this vicinity. They usually show up in May, but this year they came on in April and stayed and "bit" well for fully three weeks. The price locally varies from $1\frac{1}{2}$ to 3 cents per pound, but as the fish ran large and "bit" so freely the fishermen did very well on them. The traps in the Sound caught but few scup, although the sea bass were more plentiful than for several years. The Bay traps did very well on scup, taking several large hauls. The handliners also had a very good year on scup, some of the two-man boats stocking well over \$2,000 for four months fishing, which is considered good, as their expenses are naturally small. Mackerel, both net and seine, were scarce, the netters getting only about a week's fishing, while the seiners did practically nothing. The price was low, due no doubt to the exceptionally large catches being landed to the westward.

The inshore fleet of swordfishermen fared hard the early part of the season due to the prevalence of rainy, easterly weather that prevailed up to the middle of August. The weather, however, allowed the fish to work in towards the shore and to "bunch up" and the fishermen did very well from then on, so well that the season would rank possibly somewhat above the average.

The lobstermen were also hampered by the bad weather and especially by the very heavy swell and gale of August 24 which practically destroyed the gear of all hands. After they got fishing again, however, they found lobsters more plentiful than before, these increased catches being met by very high prices, 50 cents per pound wholesale, so that the season commercially will rate as the best for the past three or four years. It should be noted here as part of what a fisherman has to meet in his daily work, that a fleet of 18 destroyers of the United States Navy used Menemsha Bight for a harbor for a long time, steaming off-shore every morning and coming back again at night. They showed little or no regard for the gear set by the fishermen and in consequence the loss to the fishermen caused by their activities was great. It is understood that the fishermen of the Island are making efforts to have their anchorage changed in the future. The catch of summer flukes was about the same as during the past few years, the small draggers doing fairly well, but for a short period only.

Sea scalloping has been carried on in this vicinity very extensively

during the past season. This is practically a new industry for these parts, although sea scallops have been occasionally fished for with more or less success in outside waters. This year sea scallops were found very plentiful south of No Man's Land in about 26 fathoms of water. About 50 crafts of all sorts, from cat boats to 80-foot schooners, were engaged in this fishery, carrying from two or eight men and landing from 200 to 1200 gallons at an average price of \$2 per gallon on a trip lasting usually two days and one night. Some of the larger crafts engaging in this fishery had stocked up to \$18,000 this Fall, and they are still at it and doing well whenever the weather permits them to fish, with the price in November around \$4 per gallon.

The Bay traps have had an unusual run of butterfish this fall and the traps are still fishing. Flounders are now running and the small draggers are landing about five barrels daily, clearing about \$10 a barrel laid down in New York. Codfish have been very plentiful around No Man's Land this fall and boats have made good catches with prices ranging around \$4 per hundred weight at the Woods Hole market. Mackerel have not shown up around here this fall, neither have there been any schools of menhaden seen during the summer, although there has been a marked increase in the number and size of bluefish taken. So encouraging is this increase in the catch of bluefish that it almost seems safe, in the minds of the fishermen, to predict that the bluefish are gradually coming back.

With reference to the fisheries of the Vineyard, there are some features which may be summed up in a single paragraph which will be found of peculiar interest. For instance, no yellow tails were landed this year. Two or three Spanish mackerel, which are certainly out of their latitude in these waters, were taken here, as were also two or three king fish. It is also recorded that a tarpon, whose habitat is in the warm waters of the Florida coast, was caught in a trap at Menemsha Bight, while two or three salmon were also taken at the same place. No horse mackerel were reported taken, while the traps were over-loaded with whiting. While there was a large catch of pollock this year, but it was noticeable that there was only an average season on haddock with some showing in the spring. As noted above, the codfish season was very good, the fish running bigger than usual and very plentiful, although not so close inshore. Mackerel of course were very abundant throughout the season. No hali-but were taken. Flounders were scarce in the summer, while the winter fishing was as good as last year. For alewives an average season can be reported, while the catch of tautog would be considered only an average, but these fish were not fished for as hard as in previous years.

Among the outstanding features are the facts that more sea bass were taken than last year, also more scup; in fact, this was a big season on scup, while no recent year has ever equalled the present on the catch of butterfish which are and have been running quite late. It was an average season on swordfish and the small boats got more fish inshore than last year. The eel catch can be considered as average, and with good weather last year's landings would certainly have been exceeded. More bonita were taken than for several years and they ran of larger size than common. A few more of the high lights of the Vineyard fishing season can be briefly summarized as follows:—More weakfish than from 10 to 20 years. Bluefish catch showed a big increase and in the opinion of the fishermen the landings were the most for 35 years at least. A few sturgeon also were taken by the swordfish boats, but there is no record of any boats engaging in this fishery with nets. Striped bass, a splendid fish viewed from not only eating, but sporting angles, showed up in unusual quantities, and more than common were taken.

Boston Fishing Activities

It is simply wonderful to note that for six consecutive years the receipts of fresh fish at the Boston Fish Pier have toppled over each other

in the evident desire to maintain the claim of the city as the premier fresh fishing port of the new world. And not only this, but to put at present and for all time the name of Boston as synonymous with Grimsby and Hull of England as the really largest sources of fish supply in the world.

The evident desire on the part of the captains and the fishermen themselves, as well as the dealers, that fish to be shipped to the consumer via the retail route must be quality fish, is pleasing and is to be commended. In other words, good fish is the rule and poor fish the exception. The various seasons wherein different species of fish are handled at the Fish Pier has brought about a very successful year for all engaged, fishermen, dealers and shippers. It is possible that the margin of profit has been small, but the fact remains that Massachusetts fish, from the Boston Fish Pier, are today being laid down in fit food order on the Pacific coast.

In this connection this report would be incomplete without the authoritative statements of Fred F. Dimick, Secretary of the Boston Fish Bureau. This office is pleased to receive Mr. Dimick's resumé for the year and considers it of such value as to print entire. Mr. Dimick says:

"Groundfish have been in good supply from the fishing fleet, and dealers have had a good trade. There is some complaint, however, of the small profits in the business. The business in haddock filets has continued to expand, and large quantities of haddocks are used in that branch of the business. Many of the dealers are now equipped for handling the fillet business. Advertising, and modern methods of merchandizing, are being used more and more.

"The receipts of fish at Boston Fish Pier direct from the fishing fleet for the sixth consecutive year make a new record.

"The catch of haddock in South Channel, and off South Shoal Lightship has been large, but the catch of codfish and haddock on Georges and Western Banks has been light.

"Although the catch of mackerel was not so large as last year a large amount of these fish has been distributed. The spring catch was very large and comprised fish weighing mostly $1\frac{1}{2}$ pounds each. Considerable less mackerel were frozen than in the previous year and scarcely any were taken on the New England coast east of Cape Ann.

"More bulls-eye mackerel were taken, and seen this year, than for many years. The bulls-eye mackerel weighed about half a pound each but were in very light demand.

"The swordfish fleet early in the season experienced much unfavorable weather, and the catch of the fish was not so large as in the previous year. Prices averaged 2 cents per pound higher than in the previous year.

"The handline codfishermen were not very successful during the past season owing to the scarcity of codfish on Georges Bank.

"The fleet of vessels engaged in flounder dragging that use small otter trawls has greatly increased as has the receipts of flounders. These vessels also land considerable haddock. During periods of favorable weather the market is often over supplied with these fish and they sell at low prices. But these fish are getting scarcer on the fishing grounds where these vessels operate.

"The catch of fish on Cape Cod has been light. The catch of whiting was considerably less than last year. There was a fair catch of herring. Very few mackerel were taken in the traps. More bluefish were taken this year than last year, and the catch of these fish appears to be increasing each year. They weigh from 1 to $1\frac{1}{2}$ pounds each.

"Canadian fish have been in light supply. The Cape Breton catch of swordfish was light and receipts of these fish declined. The Nova Scotia receipts of swordfish amounted to 1,222 fish, compared with 3,226 the previous year. When prices of mackerel were high in our markets during

the month of November, and our fleet were catching but few mackerel, shipments of mackerel were received from Nova Scotia.

"The catch of halibut by vessels engaged in this branch of fishing was larger than last year, and a number of these vessels have in some instances landed "handpicked haddock," that is haddock on which the pitchfork is not used in handling them. Some vessels have taken aboard boxes in which the fish are packed, and placed in the hold of the vessel. The Inspection Law on fish which has been in force a number of years has had an influence to improve the quality of the fish placed on the market."

**Receipts of Fish at Boston, Direct from the Fishing Fleet, from
December 1, 1926 to November 30, 1927.**

	Pounds
Large Codfish	29,894,368
Market Codfish	10,738,328
Cod Scrod	113,885
Haddock	97,014,734
Haddock (scrod)	14,608,529
Large Hake	3,485,099
Small Hake	8,835
Pollock	3,419,300
Cusk	2,288,056
Halibut	4,112,746
Mackerel	20,091,120
Swordfish	2,141,082
Miscellaneous	9,114,389
Total	197,030,471

The Gloucester Fisheries

While the landings of fish at Gloucester for the year ending November 30, 1927 show a marked falling off from the previous year of some eight million pounds, yet the fact remains that the fisheries year, taking into account the fishermen, the vessels and producers and the shippers has been one with little cause for complaint. True it is that in the early part of the year the export trade on dried fish was reduced to a minimum, and this in part accounts for the great decrease in the landings of the fleet which from May to September operates on the fishing banks to the eastward, commonly around Middle Ground and Western Bank.

In sizing up the conditions at Gloucester it is well to take note of the fact of the changing conditions in the fisheries. Where twenty years ago 50 sail of vessels sailed to the Grand Bank and contiguous grounds and brought home two trips of salted codfish each year, at the present season but one craft went; this one the famous sch. Columbia, possibly the finest and fastest vessel ever "cut out of wood." In the terrible gale of August 24, she probably met her doom with all on board, some twenty hardy fishermen, near the unyielding sands of Sable Island where the tremendous breakers rolled her without a trace of human sympathy. This leaves the port of Gloucester without a single craft to engage in what is commonly known as "salt fishing."

Because of the unsettled and almost disintegrated southern markets for cured fish in the spring the desire for splitting fish was very small and this in part explains the great reduction in the amounts landed of fresh codfish. However, the Gloucester fish business is advancing rapidly in the line of canned fish of first quality and several firms engaged in producing these goods have found the need of even more haddock than were landed last year.

As was stated above, the port sends out no vessels to bring home salted codfish, and yet so great is the demand of the curers and shippers that one concern alone this fall brought to its wharves in one steamer over

three million pounds of salted codfish produced in the waters of the Faroe Islands. It is evident that these concerns owning vessels and also being shippers of the best quality of goods at all times must find it cheaper to thus produce the salted product in the whole fish condition from other sources than their own expensive vessels.

Taken as a whole in all branches of the fisheries the Gloucester vessels fared well and no complaint is heard of poor trips or hard times.

The following table gives the landing of fish at this port from December 1, 1926 to November 30, 1927.

	Pounds
Fresh Cod	19,085,679
Salt Cod	2,348,886
Halibut	57,453
Halibut Flitches	9,067
Haddock	11,878,217
Salt Haddock	82,916
Hake	771,412
Salt Hake	418,003
Cusk	384,936
Salt Cusk	108,365
Pollock	3,184,314
Salt Pollock	172,094
Not Product of American Fisheries	5,305,011
Fresh Mackerel	7,174,988
Salt Mackerel (Domestic)	544,200
Salt Mackerel (Foreign)	134,800
Fresh Herring	1,053,957
Pickled Herring	40,800
Salt Bulk Herring	679,952
Scotch Cured Herring	40,000
Cured Fish	1,650,077
Miscellaneous	1,369,719
Total	56,494,846

SHORE FISHERIES

Outside of the enforcement of the Fish Inspection Act, so-called, the authority and activities of this Division, as far as marine fisheries are concerned, are confined to the coastal waters within the three mile limit. Therefore it is designed to make a report here of the fisheries doings along our shores. For the purpose of convenience, let us start with the northeastern corner of our state and work down gradually, winding up at Westport and the Islands.

The Salisbury, Newburyport, Newbury and Rowley fisheries have not been very prosperous this year and some branches really seem to be on the decline. For the past few years a small fleet of flounder draggers has comprised the nucleus of the fishing force. For four years there has been a noticeable decline in this fishery until at the present time it is almost a complete failure, so much so that but ten or fifteen flounders have been the result of many a drag on grounds that a few years ago yielded hundreds of pounds to a drag. A small number of gasoline dories and rowing dories have been very active and with some success working with trawl and handline. These crafts found small cod and haddock fairly abundant throughout most of the fishing season close inshore; indeed many amateur fishermen made good hauls of cod while fishing from boats and off the jetties at the mouth of the Merrimack River.

During the latter part of November there was an abundance of squid along the shores and in natural consequence large cod were being taken close in upon the beaches and near to the jetties, both trawl and handline, by the commercial fishermen of Salisbury and Newburyport. These fish-

ermen claim that this same school of fish has been on the various outer ledges of the Bay since the latter part of the summer, but because of so much thick, rainy and windy weather prevailing at the time indicated, the fishermen could not, by reason of inability to find their range marks, prosecute their fishing then on these spots. Mackerel were unusually abundant during July and part of August, but few were taken by net and seine locally, though many were taken by hook and line off Newburyport and Ipswich bars and in Plum Island sound. It is interesting to note that while the shore fishermen in some other districts reported dogfish and sharks in plentitude, yet very few were found in this locality.

Quite a few bluebacks were seined in and just outside of the Merrimack river mouth and sold for lobster bait in New Hampshire and Maine. Menhaden schools failed to put in appearance. A few striped bass weighing from five to ten pounds were taken on the hook and line off Salisbury beach early in September, and at about the same time quite a few medium sized pollock were taken in the Bay and off the mouth of the Merrimack river by trolling.

Whiting, or silver hake, were very numerous off the beaches during the greater part of the summer season. There has been no large herring found in these waters this year, although last Spring a few were taken in nets off Salisbury beach. A few small herring were being torched in Plum Island sound and in Ipswich and Rowley rivers during late October and November. Eel fishing in season was good and very remunerative. Never before in the memory of the oldest smelt fishermen were so few smelt taken in Parker, Mill and Rowley rivers as was the case last winter. There was a good run of smelt last spring in all the spawning streams hereabouts, and a heavy deposit of spawn was left therein, much of which died. Those few smelt fishermen who have been wont to fish here for market all winter were last winter forced to take up smelt fishing in Great Bay, N. H., where, strange to say, smelt were unusually abundant. As the result of this, the state of New Hampshire has now prohibited non-residents from taking smelt in Great Bay for any purpose. Smelt have been fairly numerous in Plum Island Sound and basin this fall. These being small, very few were taken, and until the ice comes and they start working up into the tidal streams it is fair to assume that the catch will be light.

Clams are now becoming more scarce than for years and years on account of the intensive digging resulting from large areas being closed by law because of pollution. The automobile plays no small part in this story of the scarcity of the clams, as it brings many transient clam diggers to the very limited areas of good flats that are now available, and likewise brings many additional customers to buy these clams who never knew what clams were before. The resulting prices are the highest known, and though the flats of Newburyport, Newbury and Rowley are pretty well depleted, these high prices are said to have made this year's work worth more to the diggers than in recent years. Unless the regular clam diggers can agree to adopt some safe and sane program for conserving the clams at once, their livelihood will be in a very precarious position. Over-digging and the taking of undersized and very large clams are doing much to hasten this condition.

Speaking of the Gloucester to Salem district, the outstanding feature of the year is the fact that during the entire spring and summer, at which time the shore fishermen expect to do their best, there was a succession of storms and even while clear weather prevailed the winds were exceptionally heavy from the eastward and northward with the result of kicking up heavy seas, which greatly handicapped the fishermen in their labors. The loss of gear caused by such a condition amounted to quite a considerable amount, and the loss of time also was discouraging to the fishermen. The fall herring fishery of Ipswich Bay and the adjoining rivers practically amounted to nothing at all this year and hardly any

fish were taken. There seemed to have been a plentiful supply of these fish in the bay and rivers, but the condition of the market was such as to not warrant the taking of them as there was not a dollar to be made. This market condition was probably caused by the great run of herring at Provincetown and also the mackerel and other fish that were held in storage. The alewife run at Essex was one of the best for many years, but most of the fish were allowed to go into the lake to spawn. But 170 barrels were taken for market and the lessee of the fishery had so much difficulty in disposing of them at a profitable figure that he declined to bother to take any more. At Ipswich the alewife run seems to be steadily increasing from year to year and gives promise in a few years of reaching the proportion of former days.

The small boat handliners and trawlers that fished off shore still continue to carry on and manage to do very well at times. On the various grounds off Cape Ann and in Boston bay, market cod, haddock and hake are taken by this class of fishermen and are supplied to the near-by markets. The gill netters still operate but are constantly reaching out for new grounds on which to fish. This fleet which now numbers about 15 sail, is apparently paying its way, and by changing over to flounder dragging or mackerel netting during the "off" seasons seems to be keeping busy throughout the whole year and also returning a fair dollar. The trap fishery of the district was very poor owing to the inclement weather with the resultant damage done to gear and also the fact that poor hauls throughout the season left little for encouragement. Mackerel, butterfish and Old England hake, on which the trap men depend mostly for their summer's work, were not taken in any profitable quantity, and as traps are quite expensive to operate, little or no money was made.

Smelt fishing, while it cannot be classed as a commercial proposition, is carried on quite extensively hereabouts and deserves mention in passing. In the early part of the season the fishing was very poor and very few fish were taken. As the summer came into its latest things improved and during the early and late fall many good catches were made. The fish were of a very good size and were fairly well distributed through the whole district. The demand for clams is constantly on the increase, and with the closing of so many of the flats on account of contamination, the open areas are being greatly overdug with the inevitable result of the clams getting scarcer and scarcer. The clams are reproducing wonderfully, but it stands to reason that they cannot stand the strain forever and this situation is one that should receive considerable attention and study, lest before we are aware, this luscious bivalve be threatened with extermination. The clam industry furnishes employment to a great many men and as a food supply is one of considerable consequence. While the cities and towns are more or less jealous of their rights in regard to the control of the clam flats within their baliwicks; still it might be well if the State looked into the situation as it is at present, try to meet cities and towns on some common ground and all act together for the good of the industry as a whole.

As to the fisheries along the Lynn and Swampscott coastline and towns contiguous, the traps did very poorly; indeed it is not too much to say that they were operated at a loss for the season as a whole. The gill netters found their fishing fate so poor that after a very short season, principally owing to low prices of splendid shore fish, they went into lobster fishing quite a little bit earlier than usual. It was but two or three years ago that the big menhaden or "porgy" steamers made their largest and quickest hauls in this vicinity. This year but two or three of these crafts entered the bay, and as far as known, all of them not only made no sets but saw no "porgies."

Checking up on the outside, from Marblehead across to Quincy, it is found that the crab fishery has increased to a very great extent. Pos-

sibly this is owing to the scarcity of lobsters and the demand of a crustacean of similar fine fibre. Certain it is that a great many men are now engaged in this business of taking crabs and also of preparing them for family trade. The prices are such that makes it profitable not only to the fishermen themselves, but to the dealer and the many people who are engaged in removing the meat from the shells, placing them in delectable condition in ventilated tin packages. In this district crabs have been very plentiful and bring a price of from 1 to 2 cents each. This may seem a small figure, but our deputy informs us that on a morning in late October he saw a load of crabs on their way to the Boston market, there to be picked and placed on sale, which numbered 60,000 in count.

In this district only a very small quantity of mackerel and other free swimming fishes were taken as only a very few men engage in seining in this district. Herring had been plentiful, however, and extremely large quantities taken, the prices running from \$1 per barrel to sometimes twice that amount. Haddock have not been very plentiful, the gill netting fishermen usually getting the majority of large catches and occasionally a lot of whiting and hake, the latter being at times very plentiful. What is believed to be the largest quantity of quahaugs ever taken in this district was taken this year. On one occasion two men gathered ten barrels on Lynn beach, which sold at \$7.50 per barrel.

Nearly all of this district is closed to the taking of clams in accordance with Chapter 370, Acts of 1926. Up to the time of the closing of Revere Beach in accordance with this chapter, the largest quantity of clams were taken in this area. Any day one could count from 70 to 100 men digging, they receiving what is estimated from \$3 to \$4 per barrel for their efforts. A large quantity were also taken from Snake Island, Winthrop, but this area has also been closed. At present, Swampscott beach is an open territory, but no commercial diggers are allowed to operate there, owing to the fact that the area is small and the town authorities keep it for their own residents. Practically the rest of this whole district is closed under the Pollution Act, so-called.

Speaking of Boston harbor, it can be said that the lobster fishing in and around this port was very poor during the past season. The fishermen lost a great part of their lobster pots owing to the heavy winds and bad storms. Smelt fishing in Boston harbor showed a marked increase over several seasons past, indeed the fishing could be called very satisfactory. Herring were found in all parts of the harbor in very plentiful quantities.

Down along the Scituate shore and contiguous territory the mackerel fishing was not very good. For a few days these fish struck in off Plymouth, but there were no catches of any great amount. Small catches of cod and haddock were also made. The herring fishery this year in this vicinity was very good everywhere along the shore. All reports are to the effect that there has not been such a run of herring for many years. The smelt season was very good this year also. In Plymouth waters they have not found many smelts for about five years. This year, however, the fishing there was very good indeed. Scituate and Hingham both had a splendid run of fall smelt, so much so that the fishermen themselves agreed, after splendid catches during the fall season, that the smelt has come back "strong." Along the Duxbury and Kingston shore, codfishing has been below normal and smelting is reported very poor; also but few mackerel came in. In this district it should be remembered, however, that the fishery is not of a business nature but mostly for the delectation of private individuals and parties who go out to enjoy a day's fishing and engage from some local fishermen what is known as a "party" boat.

The situation along this territory, with especial reference to Plymouth might be sized up as follows:

Clams—The catch has been good in the open areas.

Oysters—None in this district.

Quahaugs—None in this district.

Scallops—None in this district.

Mackerel—Rather a small catch as compared with last year.

Codfish—About the usual catch.

Haddock—Rather a small catch.

Herring—A good catch of large sized fish.

Along from Marshfield and down to Weymouth including Cohasset, Scituate, Quincy and other places which touch upon the sea, our regular correspondent reports as follows:

"Generally speaking I should say that catches of all kinds of fish with the exception of smelt were practically the same as last year. There is little or no commercial fishing along this shore; most of it is done by city people down for a day or week-end. Day after day I have seen "party" boats come in about noon with their tubs full of codfish. When I asked why they came in so early the usual reply was that their bait was all gone."

Last winter in this district the smelting through the ice was fair but the fish were unfit for food because of oil pollution. This summer it has been a different story, however, for up to the present time, November 15, fishing all through this section has been especially fine. Most any one who knows the smelting game at all can get from five to ten dozen a day with no sign of oil in or on them. From time to time our deputy in this section has received reports of day's catches of from 40 to 50 pounds of smelts, which is certainly "high line talk."

Summary of the reports of the shore net and pound fisheries, as required by Section 148, Chapter 130, G. L. follows:—

Number of men engaged, 139; number of boats, 105; value of boats, \$40,149.40; number of fish pounds, 51; value of fish pounds, \$73,402.97; number of nets, 624; value of nets, \$12,646; catch in pounds:

Alewives	82,562	Sea bass	3,332 ³ / ₄
Bluefish	7,396 ¹ / ₂	Sea herring	743,462
Flounders	75,254	Shad	5,592
Mackerel	727,240 ³ / ₄	Squeteague	3,279
Menhaden	12,048	Striped bass	4,095
Pollock	1,136	Squid	850,575
Salmon	40 ³ / ₄	Tautog	25,084
Scup	112,047 ¹ / ₄	Other edible or bait species	1,946,069 ¹ / ₂
Total pounds, 4,599,214 ¹ / ₂ ; total value, \$126,555.66			

THE LOBSTER FISHERY

The lobster situation demands some plain speech. We stated the case in an article published in the Vineyard Gazette during the fall, which we think will bear repetition.

"We have known for years that our present laws to protect the lobster are absurd. We are killing off the brood stock without any restrictions whatever. We are permitting the sale of lobsters, many of which are killed before they have reproduced. Such business methods would promptly bankrupt the owner of a commercial fish hatchery, or any breeder of any kind of live stock. The only reason that there are any lobsters left on the coast of Massachusetts is due to the fact that it has been physically impossible for the fishermen to catch all the stock. Due to this fact the lobster is not likely to become extinct, but the industry may fall off to where there is no profit in it for anyone. But one thing is certain—we will continue to dribble along with a negligible production until such time as the situation is taken firmly in hand and some common sense business methods of handling it are adopted.

"There is still a great deal to be learned of the mysteries of the sea. We have seen certain species of fish disappear from a given region for a

period of years, only to return in large numbers at some future date. Too often we take refuge in such facts, postponing action in the hope that some phenomenon will bring back the lobster supply. But the history of this fishery is more easily traced than that of certain species of fish, for we are informed of the life cycle of the lobster, and we know its breeding grounds. Fundamental business practices can be applied to this industry, and it is simply a question as to whether the Legislature will do it.

"It has been claimed in some quarters that our existing lobster laws are the result of ignorance. There is no ignorance about it whatever. The lobster fishermen know exactly what they are doing. They know just as well as any other group of our people that the brood stock must be protected and the young be given an opportunity to reproduce if this species is to be increased. But these men, as a class, are actuated by the motive that they are going to get theirs while the going is good. The individual fisherman does not want to return an egg-bearing lobster, or a large breeder, or an immature fish back to the water for fear that some other fisherman will catch it and keep it. They want the minimum of restriction on their operations. They are opposed to any laws that will prevent them from taking the maximum number of lobsters regardless of size or condition. When the fish become exceedingly scarce in some region, the fishermen may be sobered up for the moment to the point where they are willing to advocate certain reforms, but let there be an increase, however slight, the following season, all such plans are thrown into the discard, and each man goes out to get all he can regardless. The lobster-consuming public along the shores has played some of the lobster fishermen for a bunch of suckers. These fishermen, for the sake of a dollar, have run the risk of violating the laws and being put out of business in order to bring in shorts and sell them to these people at a low price. If they had left these shorts in the water until they could be marketed as "counters" they could have gotten a fair price. Thus the fishermen have been gradually undermining their industry instead of standing together and making the public pay a fair price for a right product. The same thing is true of brushing the eggs from berried females, and so on down the line.

"The fate of the industry lies with the fishermen themselves. If the lobster ceases to be a factor, no one else will be to blame. The fishermen can have the laws they want. They can comparatively easily block any laws they do not want. Nothing is to be gained by maudlin sentiment on this subject. Anyone who has followed legislation closely in any state for a period of time knows how easily a militant, small minority can block desirable legislation where the majority is indifferent. The rank and file of our people are little interested in the fate of the lobster. It would be exceedingly difficult, if not impossible, to arouse the majority to such an extent that the militant opposition of a small minority could be overcome. This is a pretty strong indictment of the fishermen, but it is time that the public had the unvarnished facts in the case.

"The opinions of the fishermen differ so widely that it is hopeless to expect a sufficiently broad agreement on any one policy of far-reaching benefit to the industry. In the last analysis it gets down to this—the lobster industry in Massachusetts will continue in its present unsatisfactory condition, and will continue to decline to lower levels, until the lobster-eating public successfully insists on protective legislation, or the present generation of fishermen is replaced by others who are willing to apply business methods to rebuilding the industry."

During the spring, from shipments from Nova Scotia, New Brunswick and other points outside the State, there were seized at Boston 123 egg-bearing and 15,213 short live lobsters, all of which were distributed on favorable lobster locations along the whole State coast.

The totals of the tabulation of the returns of the year's fishing, re-

quired of the lobstermen by law, follow. The period covered is Oct. 20, 1926 to Oct. 20, 1927.

Number of men engaged in the fishery, 721; number of boats, 882; value of boats, \$222,923.20; number of pots used, 44,213; value of pots, \$119,443.50; number of lobsters taken, 1,112,104; pounds of lobsters, 1,668,156½; value of lobsters, \$628,151.62; number of egg-bearing lobsters taken and returned to the waters, \$12,524.

As required by Chapter 130, Section 106, General Laws, it is hereby reported that the number of lobster licenses issued in 1927 was 1,255.

BOUNTIES ON SEALS

The following towns were reimbursed by the Commonwealth for bounties paid on seals under Chapter 130, General Laws, Section 155; Barnstable, \$4; Chatham, \$2; Duxbury, \$22; Edgartown, \$2; Georgetown, \$2; Ipswich, \$56; Orleans, \$2; Plymouth, \$6; Provincetown, \$10; Rowley, \$6; Yarmouth, \$88; fees to treasurers, \$50.

The seal herds off our shore have increased to the point that they must come in for future consideration. They are difficult to pursue and kill. They not only are tenacious of life, but the killing must be done under circumstances where it is quite difficult, in most instances, to salvage the carcasses in order to obtain the evidence to collect the bounty. Under these circumstances we believe that an increase in the bounty making it \$5 would be a cheaper way of keeping these herds reduced than by the State purchasing gear (such as seal nets and boats) and hiring men to make the reduction.

MOLLUSK FISHERIES

The usual annual survey of the shellfish areas was made by the biological department, assisted by the coastal wardens and certain of the regular wardens. Statistics and details of the survey are in the office files.

An appropriation was made this year sufficient to continue the five coastal wardens originally appointed under the provisions of Chapter 370, Acts of 1926. It would appear that this is to be a fixture in our activities for an indefinite period.

Clam

In our previous report we called attention to the substantial percentage of what were former producing clam flats from which the diggers are now barred, due to pollution. In the main this pollution is not such as to endanger the life of the clam, and therefore from the beginning we have had under consideration ways and means by which clams from contaminated flats may be rendered wholesome for food.

Pursuant to Chapter 33, Resolves of 1927, the Department of Conservation was authorized to investigate the feasibility of transplanting shellfish from the contaminated areas to clean areas in cribs or otherwise, to see whether, within a reasonable time, they would purge themselves of pollution, and if so, whether they could be handled in this manner on a sufficiently large scale to be practicable as a commercial proposition.

The Department of Public Health, upon the request of the Department of Conservation, was authorized to investigate as to the feasibility and practicability of rendering such shellfish safe for use as food by means of disinfection or otherwise. These departments were to report to the Legislature as of December 1, 1927. Our department reported that, as a result of its investigations, assisted by the Department of Public Health, it is impracticable to treat soft-shelled clams by transferring them from the polluted waters to clean waters. It is found that the loss due to transportation, to natural enemies, and possibly to damage in digging, was at least ten percent, and furthermore, after the necessary safe period of submergence in clean waters, which is at least three weeks, the clams were apparently not as active or of as palatable a quality as soft-shelled clams freshly dug.

The Department of Public Health found that it is practicable to purify

clams by the use of chlorine. Investigations were conducted by it in a plant constructed under the Plum Island Bridge in the city of Newburyport, both during the summer when the water temperatures were high, and late in the fall when they were comparatively low. While the plant was a small one, it demonstrated that soft-shelled clams can be satisfactorily purified by chlorine treatment in two days or forty-eight hours, and generally in twenty-four hours. It states that it seems reasonable to believe that similar satisfactory results could be obtained in the operation of a large plant. The cost of chlorine would be small, the plant would not have to be expensive, and the principal cost would be the adequate salary of a chemist or bacteriologist, whom it would be necessary to have as superintendent of the plant in order that the work might be satisfactorily carried on, and continual determination made of the efficiency of the treatment.

In conclusion the two departments agreed that, in the light of their joint experiences in the past two years in trying to exclude the public from the sources of the contaminated flats (particularly such areas as Boston and Lynn harbors), the handling of such an enterprise as a chlorination plant, dealing as it would with a commodity in the first instance highly dangerous to public health, would have to be on a strictly business basis, and surrounded with such protection as would eliminate the exposure or risk to the public. The flats could not be thrown open to digging by the general public. It would be necessary to restrict the exploitation of a given territory to some one individual, or group of individuals operating under a corporate organization, properly licensed by the State, to the end that responsibility could be narrowed down, proper rules and regulations applied, and adequate supervision insured.

The report also stated, "we do not believe it would be advisable for the Commonwealth to set up a reclamation plant adjoining any of the polluted clam flats, but the construction and operation of such a plant might well be carefully considered by the municipality within whose borders such flats are found."

Information obtained through the shore wardens from the diggers and those engaged commercially in the business, indicates that the season in most sections of the State where clams were dug averaged fair, though in several sections there was a poor season. The market prices for clams ranged considerably higher than in 1926 (in fact, in most cases the highest ever obtained). The total production in the State was less than half the quantity of clams dug in 1926.

Oyster

A normal year was reported from the districts in which oysters are taken. In fact, statistics collected indicate that the production was considerably greater this year than in 1926, and the prices averaged about the same.

Quahaug

In connection with the investigation by our department of the feasibility of transporting shellfish from contaminated areas to clean areas to see whether within a reasonable time they would purge themselves of pollution, and if so, whether they could be handled in this manner on a sufficiently large scale to be practicable as a commercial proposition—we found that there was much merit in the transportation of quahaugs taken from contaminated areas, into clean water, where they can readily dig themselves in and reach their natural environment.

Statistics obtained from diggers and those engaged in the quahaug business commercially indicate a prosperous season in most of the sections in which quahaugs are collected. Prices in most instances were considerably higher than ever before obtained and the production was decidedly greater.

Scallop

A prosperous year was reported by the towns in which the best scallop waters are located. The data collected indicates a poor year from most of the other towns. The production and prices were considerably higher than those of 1926.

The usual annual check-up of the alewife fisheries in the State was made during the spring and summer. This included the continuation of efforts to open all streams from headwaters to sea; the construction of fishways where necessary; the upkeep and keeping in correct working order of present fishways, and in addition, collecting data on all alewife runs in all streams in the spring; planting alewives of spawning age in depleted streams; and the brief yearly survey of the industry from a commercial standpoint.

Statistics were obtained wherever possible on the commercial fisheries and these are on file in the central office. The reported catch of alewives for the year showed a slight increase over last year's figures—10,264 in 1926 against 10,508 in 1927.

There were a number of streams on which seining and fishing privileges were sold during the year, and while large numbers of fish taken from these streams, the lessees in many cases made certain that large numbers of fish were allowed to run to the spawning beds, particularly where a lease extends over a period of years. Streams which were leased or on which seining privileges were sold report prices from \$5 to \$2,000—some of these extending over a five-year period. The prices on alewives caught and sold during the spring run were obtained from those engaged in the industry wherever possible, and prices ranged from 75 cents to \$4 per barrel.

The transportation of alewives of spawning age continued and 2,094 were planted (see Fish Distribution). The results of these stockings are proving most successful, for thousands of young fish are seen returning to the sea in the fall.

Respectfully submitted,

WILLIAM C. ADAMS

Director.

APPENDIX

RECOMMENDATIONS TO BE CONTAINED IN THE SIXTY-SECOND ANNUAL REPORT OF THE DIVISION OF FISHERIES AND GAME FOR THE YEAR 1927.

The Director respectfully recommends the passage of the following laws:

Salary of the Director.—Owing to the steady growth in the volume of business in this Division, it is the opinion of the Commissioner that the Director is not receiving a salary commensurate with his duties and responsibilities. Inasmuch as the salary of this position is fixed by statute and could not be considered at the time of the recent classification, the Commissioner recommends that it be increased such an amount as will bring it up to the standard fixed for positions of similar responsibilities under said classification.

Fishing in Inland Waters.—In this recommendation we propose to strike out, in section 3 of the license law, the words "stocked by the Director or his predecessors since January 1, 1910." That provision makes it unnecessary for any one to take out a sporting license to fish in any of our inland waters which have not been stocked since January 1, 1910. There is no excuse for retaining it on the books. A sporting license should be required of all those who fish on the inland waters of the Commonwealth, no matter when such waters were stocked.

Public Rights in Certain Great Ponds.—From 1647 up to 1869 the right to fish in all natural great ponds of ten acres and upwards was preserved to the inhabitants of this Commonwealth. In 1869 a law was passed which took away such public rights to fish in all such natural great ponds between ten and twenty acres, and gave the owners of the land around such ponds the control of the fisheries therein. As a result such riparian owners are now in a position to exclude the public from these natural great ponds between ten and twenty acres, thus defeating a right which the public enjoyed for over two hundred years. We believe that this (now embodied in section 24 of chapter 130 of the General Laws) should be repealed, and the public right of fishing in such natural great ponds between ten and twenty acres should be restored.

Sporting and Trapping Licenses.—Under existing law only the city and town clerks can issue sporting licenses. They retain twenty-five cents as their fee. In other words, one-ninth of all the money contributed by the anglers and hunters is absorbed by these agencies. There is a growing tendency in administrative circles to require each department and division of the State government to be as nearly self-supporting as possible. The total income from licenses and fines has a direct bearing on the total appropriations for this Division. If the license law is amended to permit the Division to employ additional agencies to issue licenses we believe we can build up a group which will handle the licenses without charge. We refer to sporting goods houses, etc. Without going into all the details it is sufficient to say that such agencies can be handled on exactly the system now being used with the city and town clerks, and the interest of the Commonwealth can be protected through a blanket insurance policy automatically covering all agents so appointed. The plan does not contemplate taking the right to issue licenses away from the city and town clerks. It proposes to add additional agents through which some of the fees can be saved to swell the total annual revenues; to make it more convenient for the public to purchase licenses; and to provide a system by which we can reach and sell licenses to a substantial portion of our people who are not interested in hunting and fishing, but who enjoy the outdoors and would purchase licenses to help along the cause if we had the means of injecting the element of salesmanship into the license distribution system.

Salary of Town and City Fish and Game Wardens.—The law provides

that cities and towns may appoint a local warden to serve under the direction of the Division, and whose salary shall be paid by such city or town; also that such salary shall not exceed \$100. If this restriction was removed we believe that some cities and towns would be willing to pay a larger salary, with a result that the warden would give a larger amount of service, with a corresponding benefit to the work of law enforcement, than is now the case.

Fishing in Inland Waters.—This recommendation is to prohibit all fishing except for trout in February, March and April. The views of the Division on the subject of winter fishing are too well known to require repetition. Last year we stated: "The demand on the fish stock in our ponds and streams is so great that we do not believe even present supplies can be maintained so long as the present open seasons continue." We cannot artificially propagate pickerel, horned pout, perch, etc. Yet the open seasons on these species are much longer than those on trout, which we can propagate. We cannot expect to keep up our stock of pickerel so long as we continue to take them (with the use of ten traps and a catch limit of fifteen a day) right up to the actual spawning season. We do not wish to suggest any restrictions on any branch of the sport that can possibly be avoided, but the time has come when we must face this issue squarely. If all fishing in our inland waters were prohibited during the months of February, March and April (except trout fishing on and after April 15) we would be taking a step in the right direction, and establishing a clean-cut law that could be enforced.

Taking of Wild Birds.—This recommendation is to prohibit the taking of all birds by the use of traps, nets, snares and jack lights. Under existing law these devices can be used to take birds which are not protected by law. This gives aliens the opportunity to set up such devices, and our wardens cannot prosecute them unless they catch such persons in the act of taking a bird which is protected. A warden can find such devices set up but he is powerless to prosecute until the operator is caught red-handed in the act.

Certain Apparatus in Inland Waters.—The law prohibits the use of nets and seines in our great ponds, but does not cover our other inland waters. As a result we have been unable to prosecute a number of cases where aliens and others have been using such devices to clean the fish out of some of our brooks and larger streams. We believe that these provisions should apply to all the inland waters of the Commonwealth, and thus give us a law that our wardens can enforce.

Damaging or Stealing of Property while Hunting, Trapping or Fishing.—Many complaints are received of the wilful or negligent injury to property on the part of persons hunting or fishing. It is the desire of the Division to protect land owners against the depredations of persons who do not respect the privilege which they have of hunting or fishing on private property. To accomplish this the wardens should be empowered to arrest and prosecute any person whom they find destroying, stealing or injuring property. Our wardens spend the greater portion of their time in the back country regions, and we believe they can be used as a valuable police force in the remote rural districts.

Possession of Certain Wild Birds.—The present law protecting wood ducks, gulls, terns and other non-game birds does not provide a penalty for the illegal possession of such birds, and in order to secure convictions a warden must find a person in the act of killing the bird. It is often very difficult to do this, and in order to make the law uniform with other sections of the game laws a change is recommended which will penalize the possession of protected birds as well as the killing of them.

Lobster Permits.—Under the present law the Division issues permits regulating the sale of lobster meat. In furtherance of our efforts to make this Division self-supporting while at the same time enlarging our facilities to render increased service to all activities included within it, we are

recommending the provision of a fee of \$5 in order to cover the cost of issuing these permits and the supervision of the places where lobster meat is sold.

Revocation of Lobster Licenses.—Under the present law a lobster fisherman's license is revoked for a second conviction of certain specified violations of the lobster laws. Many times a lobster fisherman can repeatedly violate other provisions of the lobster laws and continue to engage in lobster fishing. It is the opinion of the Division that when a man is convicted a second time for any violation of the fish and game laws his license should be revoked for a period of one year.

Taking of Fish by Means of Torches in Certain Waters.—Under the present law the Division is authorized to issue permits for the torching of herring in certain waters adjacent to Boston Harbor. To efficiently enforce this law requires the outlay of considerable money, and if the operations of the persons who have these permits are to be supervised and their rights protected they must be willing to pay a license fee sufficient to cover the cost of such service as other persons do who benefit by the service of the Division. It is felt that a fee of \$50 is reasonable in view of the fact that this law will result in a larger return on their investments. Unless the torching operations are carefully supervised much damage to shipping and wharf property may result from the careless use of torches and their contents.

Taking of Lobsters and Crabs.—At the present time no license is required to set traps for the purpose of catching crabs, yet the traps used in this fishery will take lobsters, for the taking of which a license is required. Unless this law is extended to cover the taking of crabs it will be impossible to enforce the lobster license law as it should be enforced. This act will also impose a penalty upon any person who obtains a lobster fisherman's license by making false representations.

Sale and Cold Storage of Fresh Food Fish.—This change in the fish inspection law is asked for because, after seven years of enforcement of the same, it is found necessary to make section 82 definite, and to thus carry out what was actually the intention of the law as it was passed in 1919. It has been found in presenting cases to court that there is a condition of affairs, when cases are brought under the "third-grade fish not be sold at retail," which makes it at times a question as to conviction or otherwise. Some lawyers are bringing up the point that because a market sells goods to a restaurant it is really a wholesale place. This was not the intent of the original law, and so it is found necessary to strengthen the present law and yet not go outside the bounds of the original intent to make the changes as are suggested herewith in section 82. It is well known that in the original law the terms "third-grade" and "wholesale" were meant to apply to vessel loads or parts of vessel loads of fish and to real wholesale dealers of Boston and Gloucester. The proposed change will greatly strengthen the act and work for the betterment of the fish-consuming public of the Commonwealth.